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PRESENT DAY PROBLEMS*

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THE scientific and industrial achievements of the first quarter of the present century have so far outdone those of the preceding quarter of a century that they may be typified by a comparison of the automobile to the bicycle; an aeroplane to a toy balloon; a motion picture to a tintype. The progress of America during this period was markedly more important in the field of science, the invention and perfection of mechanical processes, and the extension of knowledge, than in the field of politics. The more formal historians would probably say that the most important event since 1900 was America's participation in the Great War. Any attempt at contradiction puts a heavy burden of proof on the proponent. Nevertheless, it is a reasonable query whether there is not equal importance in the fact that during this period the average man's tenure of life has increased by about seven years. In a history which aims to keep in mind the average man, it may be that the scientists, who, by discoveries in the field of prevention and cure of disease, increased by about 15 per cent that average man's tenure of existence on this earth, multiplied his defenses against disease, and prolonged his existence, should appropriately be given as much mention as the politicians and military leaders who conducted us into and through the Great War.

As a concrete illustration, chosen chiefly because of the coincidence in time and place that gives it vivid concreteness: On the Isthmus of Panama during the early years of this period three things occurred: One, political; a revolution, and some further transactions having to do with the government of the United States. The

second, in the field of engineering, the digging of a canal which reduces by 8,000 miles, and by upward of twenty days, the transporting of goods and passengers by water between the Atlantic and Pacific coasts of the United States. The third, in the field of science, the proof that yellow fever is caused by infection from mosquitoes, and the beginning of the wiping of that disease from the face of the earth. This discovery also led to the prevention and cure of other diseases due to animal parasites.

Walter Reed, in August and September of 1900, proved that yellow fever was caused by the mosquito, and Gorgas' achievement more than any one act of government or engineers made possible the digging of the Canal.

Who can say but that Henry Ford as the manufacturer of inexpensive automobiles may have had a more far-reaching effect on the lives of the average Americans than Warren G. Harding; that C. Latham Sholes, who invented the typewriter and thereby was largely responsible for the introduction of women into business offices, was of more fundamental consequence to a larger number of human beings than Joseph G. Cannon; that the discovery of the remedy for diabetes may have done more for human happiness than the entire thirty-one years of Henry Cabot Lodge in the Senate; that the acquisition of the Philippine Islands may have been of less real consequence to the average American than the increase in the effectiveness and abundance of flypaper and window-screens; that the perfecting of the vacuum cleaner and the electric flat-iron may have meant as much to the average woman as the bringing of woman suffrage?

At the present time there is no difficulty in demonstrating to the satisfaction of most people

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that a nation's greatest asset is physical and mental health. The prosperity and happiness of a people are largely dependent upon mental and physical vigor. I believe it is also correct that our knowledge of diagnosis, treatment, and prevention of disease is far in advance of its application to the needs of an individual or community. The largest problem, therefore, before the medical profession at this moment is the closing of that gap which will make the application of our present knowledge both available and effective. Any scheme dealing with public programs must be judged ultimately by the effects it has upon the individuals whom it is designed to help. If that is true, a plan of medical service must be judged from the effects upon those in need of medical advice and treatment and the cost of services rendered. Because of the technical character of medical service it is reasonable to insist that it be provided by those who have had training which qualifies them to perform it. The essential feature of a competent and effective medical service is trained and informed personnel. Today, the public has become health conscious and desirous of obtaining the benefits of the present day knowledge regarding disease and its prevention.

We, as a profession, should be responsive. A country which endeavors to regulate by law its industries and railroads and to manage a scheme of compulsory universal education is likely to make an effort to improve and conserve its greatest asset, the health of the people. Whether the scheme to be used will be sound depends to a considerable extent upon the type of leadership in the program. If we are right in assuming that every individual in the community should receive the benefits of modern medical knowledge, and that considerable numbers still do not receive such benefits, it is more than likely that efforts by amateurs, social uplifters, politicians, and others will be made to correct that situation. The fact is that we have now in America a new professional group, the social worker group, with its specialized training and its diversified interests that are as wide as all society. These new professional men and women are professionally interested in poverty and sickness. It is only another step, and a step which they make with enthusiasm, to interest themselves in the medical profession and its problems. The committee on the cost of medical care is one practical result

of this intelligent active interest, and when this final report comes will we be like the Trojans, alarmed when their enemy leaped at them from the wooden horse, or will we be ready to lead and guide? It matters not how sincere these efforts are or how serious some of the difficulties in the distribution of medical care may be, there are certain fundamentals which will determine the ultimate success of any plan.

There are several phases to this problem. First, the economic. Second, the professional organization which will provide a proper distribution of professional services to meet effectively the actual needs of the community. No plan of medical care can be fully successful without intelligent public opinion and coöperation based on confidence in those conducting the program. Third, the educational program necessary to keep this personnel abreast of any knowledge and methods constantly being developed in medicine and prevention of disease.

Most attention has recently been directed toward the economic aspect of this problem and an effort has been made to create the impression that the cost of medical care is unreasonably high. All of you are familiar with the fact that at all times an average of 2 per cent of the population is incapacitated and about twice that percentage is impaired or handicapped. The financial loss to the country represented by lost earning power and reduced production totals well over two billions of dollars a year or equivalent to one-half the cost of maintaining the national government. The economic features associated with preventable and premature deaths represents a very large loss which we shall not try to estimate at this time. The cost of medical care per family per year is shown below:

Patent medicine and drugs.....	\$ 25.00
Physician	24.00
Hospital (civil).....	15.00
Nursing	8.00
Dentist	6.00
Non-medical practitioner.....	2.00
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	\$ 80.00

The total expenditures represent a little over 2 per cent of our national income.

A few illustrations of our national expenditures per family per year follow:

Passenger automobiles.....	\$150.00
Tobacco	67.00
Candy	37.00
Gasoline	37.00

Movies and entertainment.....	35.00
Soft drinks, ice cream, gum.....	34.00
Jewelry and furs.....	29.00
Radio and musical instruments.....	16.00
Sporting goods, toys, games.....	16.00
Perfumes, cosmetics, toilet soaps.....	15.00

\$436.00

These items total about five and one-half times the total cost of all non-governmental health service. The amount expended on tobacco is almost three times as much as that expended for physicians. We spend a great deal more for candy than we do for doctors. Our expenditures for entertainment are twice those for the maintenance of civil hospitals. We spend twice as much for perfumes, cosmetics and toilet soap as we do for nursing. The explanation for that situation is not difficult to find, for the people of the country buy what they are taught to buy. One billion, five hundred thousand dollars are expended each year in that education by means of advertising, and W. E. Humphrey, Federal Trade Commissioner, states that the publication of fraudulent advertising in magazines and newspapers costs the American public about five hundred million dollars annually. It has been estimated conservatively that the vital or human value of the American people, if one were to expend it in monetary value, is about five times the material wealth of the country. The latter is over three billion dollars, which means that the expenditures for all forms of medical service are about two-tenths of one per cent of the human value. In fact, there is every reason to believe that the present expenditures for medical care may be insufficient to create an adequate service. Certainly they are reasonable.

However, the fact that the cost of medical care is not overwhelming does not relieve the medical profession of its responsibility for working out a satisfactory and more universal plan of medical service. Many methods have been employed in different countries to try and solve this difficulty. We have at present twenty-three countries which have adopted the principle of compulsory health insurance, and seventeen countries that have voluntary health insurance. We all know more or less about the effect of the insurance plan. It is time now to study it thoroughly, to see if we want to be tied up by any such plan. It does not follow for one moment that national insurance on a compulsory or voluntary basis is the only

method of dealing with this situation. There are many who believe that it is possible to avoid this serious difficulty of national insurance by the development of other schemes which will retain the advantages and strengthen the features of individual and voluntary effort, and that there are fundamental advantages in the American scheme which need to be capitalized and made more widely available, which a governmentally regulated medical service is likely to destroy.

Let me mention a few of these advantages: The number of hospital beds in the United States has increased 127 per cent in the last twenty years. The capital value of hospitals in the country at present is about \$4,100,000,000, and this is an increase of 2,500 per cent in twenty-five years. The cost of hospitalization last year was about \$12,000,000 as compared with \$1,400,000 in 1904. Fifty-eight per cent of the counties in the United States now have general hospitals as compared with 44 per cent in 1920. Visiting and public health nursing, school nursing, care of well babies, pre-natal clinics, etc., indicate further efforts to provide medical care.

Many industries are establishing comprehensive medical services, some on a local insurance basis. Another feature to be mentioned is the tremendous growth of various schemes of voluntary taxation commonly designated by the term "Community Chest." Over 350 cities now have a Community Chest and last year more than \$60,000,000 was raised by them for various forms of social and medical relief.

It is hardly necessary to discuss the tremendous expansion in our idea of what constitutes adequate medical care in the light of the present day knowledge. It has been inevitable that the cost of medical care should rise, but the increase in the cost of medical service since the beginning of the century is small compared to the increase in expenditures in many other fields. Let me call to your attention the fact that the national income of this country has increased from thirty-one billion dollars in 1910 to eighty-nine billion in 1928. It is very doubtful whether provision for medical and health work is receiving an undue proportion of that increase when it is recalled that medical knowledge has been increasing at a phenomenal rate and that the largest part of the increase in the cost of medical care arises out of that new knowledge and new methods based on it. Mention need only be made of the growth of

hospitals, laboratories, nursing, X-ray, dentistry, physical therapy, and specialists to suggest elements in the greater cost which arises from the great increase in the knowledge required for proper diagnosis and treatment. Allowing for the inevitable increase in the cost of proper medical care there are, however, a number of unnecessary costs which we, as a medical profession, can avoid. Some of these are: unnecessary laboratory work, unnecessary surgery and unnecessary hospitalization, and the public's self-selection of specialists.

In considering medical economics one cannot ignore the problem of the distribution of physicians in rural communities. May I mention only two general features of this question. During the last sixty years the number of gainfully employed persons in this country who were in agricultural pursuits has dropped from 47 to 18 per cent. The contribution of agriculture to national income has dropped from 26 to 9 per cent. It will be noted that whereas 18 per cent of those gainfully employed are still in agriculture they produce only 9 per cent of the national income. Physicians in a society of free competition are bound to react to the economic standards for rural communities and that is probably the largest factor in the uneven distribution of physicians. This problem is not unique in this country. Good roads, the telephone, and the automobile have done much to meet the problem in this country. A satisfactory solution will be found, but we must not resort to methods that are too artificial. There is probably no single solution. However, there are certain general principles that might be emphasized. One of the most important is that of the prevention of disease. Everyone will agree that a considerable portion of illness and disability is preventable. We must do all we can to shift the best interest of the medical profession from ill health to good health. The physician must become a health trainer and advisor as well as a healer. It seems quite clear that the development of a fundamental basic medical service must include provision for the practice of preventive medicine as an integral part of practice. A second important emphasis should be placed upon the basic medical service which should be provided for the entire community, not alone for the small proportion which is under treatment. A third suggestion is the organization of the professional industries. Specializing is an essential part of

modern medical service but it is the responsibility of the medical profession to see that those who claim to be specialists are in fact experts in their fields. A fourth and very important feature is to provide ways and means of continuing the education of physicians in practice. This applies to the general practitioner as well as the specialist. The social, economic, and educational features of any program designed to infuse the entire profession with knowledge of new discoveries and the application of new methods should occupy the most thoughtful consideration of the medical educators and practitioners. Knowledge is not distributable in packages like commodities and should be only in the hands of those who are trained to use it.

In conclusion, there are two outstanding trends of our age, the democratic and the scientific. The success of any democracy depends upon leadership. We look for such leadership in law, education, business, and banking and there is no reason why the public should not expect it in medicine. We possess the knowledge and personnel to solve a large national problem and possessing that knowledge we are responsible for working out the satisfactory solution. We cannot hope to enjoy that leadership to which we are rightfully entitled in modern society by constantly opposing the proposals intended to deal with medical problems even when those proposals are vague and obviously unfit and offered by those unfamiliar with the essential character of the problem.

What we need is a constructive program directed and supported by the best brains of the medical profession which will aim to provide and retain leadership in health needs and in the program of medical service through proper organization of the profession. Some scheme of medical post-graduate education, and constructive public policy and publicity—this is the challenge to the organized medical profession in this country. It can be met only by wise, far-seeing, unselfish, constructive leadership. So we can say, like the Ancient Ægean Mariner who, when tossed by the storm, prayed to Neptune, "Oh, Neptune, thou canst save me, if thou will; thou canst sink me, if thou will; whatever comes I'll keep my rudder true."

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UNDULANT FEVER*

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DURING the years 1924 and 1925 in the United States (exclusive of Texas, Arizona and New Mexico) ten cases of undulant fever were reported in six widely separated states. During 1928 and in the first five months of 1929 more than 1,000 cases were reported in 42 states. In Minnesota, prior to 1928, six cases were reported; in 1928, twelve cases; 1929, forty-one, and in 1930, sixty-two. This year, up to the present time (March, 1931) seven cases have been reported and verified by positive blood agglutinations at the State Board of Public Health. Thus, the frequency of the disease is becoming more striking, and at a recent meeting of the Health Section of the League of Nations it was stated that undulant fever is the most important problem facing public health workers at the present time.

ETIOLOGY

In December 1886, Colonel Bruce¹ observed minute organisms in a spleen from a patient who had died of undulant fever. A year later he cultivated an organism which he showed to be the etiologic agent of the disease. The name "*micrococcus melitensis*" was adopted. Soon after it was pointed out that bacillary forms, as well as coccoid forms, occurred.

Ten years later (1897) Bang² described an organism causing contagious abortion in animals. He noticed that these organisms, when appearing in infected tissues, often appeared coccoid in shape. After isolation, however, he determined he was dealing with a bacillus and the term "*bacillus abortus*" was accepted.

For twenty years these organisms were differently named and even considered by bacteriologists to be unrelated. In 1918 Alice Evans³ showed that these two organisms were morphologically, culturally and biochemically indistinguishable, and serologically closely related. A new classification was therefore necessary. Meyer⁴ proposed the name "*Brucella*," in honor of Bruce; thus, the term "*Brucella melitensis*." Previous distinction had been maintained by the recognition of the different varieties. *Micrococ-*

cus melitensis became *Brucella melitensis* (variety *melitensis*) and *Brucella abortus*, variety *abortus*. The latter type is divided into the porcine and bovine types.

The natural habitat of the *melitensis* type is in the goat. Texas, New Mexico and Arizona are the only states in the Union in which the *melitensis* is of much importance.

A survey of the literature shows that the *abortus* type is found in practically all parts of the world.

Morphologically, these organisms are small, non-encapsulated, non-motile and gram-negative. Coccoid and bacillary forms occur as well as intermediary oval shapes. Culturally, growth takes place slowly in liquid medium, rarely being visible before the fourth day, and occasionally not until the tenth day. On agar, the colonies on first subculture usually make their appearance in from 48 to 72 hours and slowly increase in size. They are non-acid, non-gas forming. By simple agglutination procedures the strains cannot be differentiated.

MODE OF TRANSMISSION

Formerly it was supposed that undulant fever was transmitted solely through the use of milk. However, clinicians who have had experience with a large number of cases found they could not account for all their cases as being due to ingestion of milk. The incidence among doctors and technicians working in laboratories with the organism soon became striking. Likewise, the incidence among veterinarians and farmers increased. Dr. Bonyng⁵ reported the disease in an eleven months old infant who had been fed on certified milk. Three other children in the same family, using the same milk, did not have the disease. Either this was a congenital case or contact. Hardy⁶ proved that the disease was transmitted by contact. He took a series of guinea pigs, and in one set he shaved the hair and abraided the skin, then applied the organisms. In this group 100 per cent of the pigs developed undulant fever. In a second series the guinea pigs were only shaved and the organism applied. Here 90 per cent of the pigs developed undulant

*Presented before the Staff of The Charles T. Miller Hospital, Saint Paul, March 3, 1931.

fever. In the third series the hair was only clipped and the organisms applied. Seventy-eight per cent developed undulant fever. In the fourth series the organisms were fed to the animals; only 22 per cent developed the disease. Dr. Carpenter⁷ isolated *Brucella abortus* from tonsils and lymph nodes. He also found that these tissues remained infected longest.

In cattle "contagious abortion" is a misnomer. The disease frequently affects non-pregnant cows, and the disease commonly affects bulls. Calves possess a relative immunity. Ninety per cent of the herds of Connecticut and 86 per cent of the herds of Pennsylvania are said to be infected. Hirschboeck⁸ reports that out of 16,319 cattle tested at the University of Minnesota farm school, 4,938 gave strongly positive serological reactions, and 726 reacted in dilution below 1:100. Simpson⁹ in examining a group of cattle found 86 per cent of the cows and 100 per cent of the bulls infected. Eight calves gave negative results. It is the belief among veterinarians that the disease may be transmitted to cows by the bull through the seminal route. Organisms have been found in bovine placenta and also in fetuses. Simpson¹⁰ found three cases in men who first went to a genito-urinary clinic, thinking they had Neisserian infections. Sera agglutination was positive. In one case *Brucella abortus* was recovered from a sinus tract extending through the scrotal wall.

It is highly probable then that the ingestion of milk is not the only source of transmission.

LABORATORY FINDINGS

The most reliable diagnosis of undulant fever is made by the agglutination test, or by the isolation of the organism. Not all cases of proven undulant fever show a positive agglutination. Carpenter and Boak⁷ found this discrepancy in 6 per cent of their cases. Once present, however, it remains positive for two to ten years. Frequently sera show a pre-zone; this means that in the lower dilutions sera will not show agglutination, while perfect agglutination will be found in dilution of 1:400 or above. Thus, the importance of running a series of dilutions.

There is some doubt as to the value of the lower titers. However, the consensus of opinion is that in cases with positive agglutinations of 1:80 the definite clinical picture of undulant fever is generally present. Cases with dilutions of 1:40

are usually considered negative, but the physician must consider his case very carefully and be guarded in his statements before giving his opinion, since it is the rule that the titer falls as the patient gets farther along in convalescence. The lower dilutions without symptoms may be an indication of past infection. In those cases of clinical undulant fever which do not show positive agglutination, other laboratory methods of ruling out the disease are available. In this respect recovery of the organism from the blood stream is the next best method. The technic, however, is still in the experimental stage, but promises to be of considerable value. Hardy¹¹ was able to get 22 positive blood cultures in his series.

Kristensen reported 65 per cent positive blood cultures in his series. Baker¹² reported a case of intermittent hydrarthrosis in which he was able to demonstrate the organisms in both the aspirated fluid and blood culture. Amoss¹³ isolated the organism from the stools in a clinically and serologically proven case by agglutination and planting. The complement fixation test has no advantage over the agglutination test and is not as reliable. Guinea pigs and mice are the best laboratory animals for injection. The value of the skin test is also in the experimental stage, but those who are using it feel that it has a distinct diagnostic value. In mild cases the hemoglobin and red blood cell count are not materially changed. A leukopenia with a relative lymphocytosis is a usual finding at some stage of the disease. Carpenter and Boak⁷ found on the average a white count of 4,200, with a lymphocytosis as high as 48 per cent. A high proportion of monocytes are often noted, and a polymorphonuclear leukocytosis is often noted at the onset of the acute septic forms.

CLINICAL FEATURES OF THE DISEASE

The incubation period has not been definitely determined. In accidental laboratory infections it varied from 7 to 12 days. The general picture of the disease is one of a bacteremia. Consequently, no clear-cut picture can be made. Giordona¹⁴ and his workers classify the disease as acute and chronic forms, and then divide them into several types, such as septic, neurologic, visceral, glandular and arthritic. Hardy¹¹ in his series recorded the following nineteen complaints: Weakness, sweating, feverishness, chilliness, rigor, general aches, headache, backache,

pain in back of neck, arthralgia, abdominal pain, anorexia, nausea and vomiting, constipation, cough, sore throat, insomnia and loss of weight.

The temperature is surprisingly high in relation to the pulse, appearance and general condition. Patients with fevers of 101° and 104° often have pulses of only 90 and 100, with normal respirations. Furthermore, many patients do not look at all ill in comparison to the temperature. As a matter of fact only when having a chill will they have any discomfort, and during the inter-chill period they will feel well and not appear ill, although the temperatures may be 101° or more. The fever is usually not the true undulating type as one would expect, but more often of the type one sees in tuberculosis; i.e., high in the afternoon with morning remission. In others it may be of the continuous type. Loss of weight is fairly constant, and may be from 10 to 50 pounds.

Very often the symptoms are quite like those of an upper respiratory infection. In the last three patients seen, two had been previously diagnosed as gripe because of sore throats, slight cough, fever and backache. The third patient made her own diagnosis of gripe. However, the presence of a continual fever with chills, sweats and general body aches should put the attending physician on guard for undulant fever.

One would think that in women with repeated abortions, without findings to account for them, undulant fever would be a safe bet. In not a few cases undulant fever has been found, but in the vast majority it could not be diagnosed. Harbinson,¹⁵ in twenty-five such cases, could only find two showing positive agglutination and then only in low dilutions. Carpenter¹⁶ studied blood from twenty-eight women who aborted and also studied twenty-seven fetuses and twenty-eight placentas. In all of these he found not a single case of undulant fever. Simpson,¹⁷ on the other hand, found positive agglutination ranging from 1:80 to 1:329 in five women who aborted repeatedly. Cornell in his series found five positive blood sera, but each patient went on to normal delivery.

On physical examination one may find very few changes. As said before, the appearance of the patient may not at all be any indication of the severity of the disease. Enlargement of the spleen is supposed to be one of the fairly constant findings. Hardy¹¹ found this organ enlarged only thirty-seven times in 125 cases. In thirty-five cases Giordano found only two with

enlarged spleens. Arthritis with swelling and tenderness of joints may be present. Redness, however, is usually absent. Evidence of orchitis, epididymitis, and oöphoritis may be present. In short, the disease may resemble almost anything, and after the diseases that usually cause a given condition have been ruled out, undulant fever should be considered.

PROGNOSIS

The prognosis is good. Hardy¹¹ reported two deaths due to endocarditis. However, there had been a pre-existing vegetative endocarditis and undulant fever appeared to have lighted up the process, as no organisms were found in the fresh vegetation. Cases of acute endocarditis going on to fatal termination have been reported due to the disease. Harbinson¹⁵ reported one death with necropsy findings. Here there was evidence of a general septicemia. The mortality ranges from 2 to 8 per cent. The degree of titer is no indication of the severity of the disease. Mild cases may have a titer of 1:1280, while very severe cases only 1:80. Duration of the disease varies from four weeks to eight or nine months.

THERAPY

The numerous recommended forms of treatment is an indication of their value. Different dyes, vaccines and serums have been used, some getting results in one case and absolutely failing in another. At present the consensus of opinion seems to be that reliance must be placed for the most part on symptomatic treatment as in certain other infectious diseases.

CASE REPORTS

Case 1.—Mrs. H. M., a housewife, thirty-five years of age, entered the hospital on August 4, 1928. She had been well up to two months prior to admission, when, without any apparent reason, she began to have chills, followed by fever and moderate sweats. With the exception of discomfort during the chills the patient did not have many complaints. The daily chills occurred for about ten days, and then she felt well. Two weeks before hospitalization the chills recurred and kept up until admission.

The family history was not important. In her past history it was brought out that the patient lived in a Saint Paul suburb, and drank milk freely. She had gone through a normal pregnancy and delivered at term three months previously.

Physical examination was negative except for a palpable spleen. On admission her temperature was 104.2 and pulse, 110. During the first part of the stay in the hospital her temperature varied between 99 and 104 . During the latter part of the stay her temperature

varied from 98.6 in the morning to 102 in the evening. The patient was given a course of acriflavin without much change in the course of her disease.

The urine was negative. On admission the leukocyte count was 6,000; polymorphonuclears, 45 per cent; lymphocytes, 54 per cent; and eosinophiles, 1 per cent. At time of discharge, examination showed the hemoglobin to be 69 per cent; R. B. C., 3,980,000; leukocytes, 4,850; polymorphonuclears, 41 per cent; lymphocytes, 58 per cent, and eosinophiles, 1 per cent. Agglutination for *Brucella abortus*, 1:3,480. Blood culture was negative. X-ray films of the chest were also negative.

On leaving the hospital the patient had very few complaints, but fluctuation in temperature persisted.

The herd from which the patient obtained milk was examined and a number of cattle were found to show an abortus infection.

Case 2.—Miss H. S., a housemaid, aged 25, was admitted to the hospital on January 28, 1931. She had become ill one and a half weeks before Christmas, at which time she complained of weakness and fatigue, chills and fever. The physician who attended her ordered her to bed, diagnosing her condition as an upper respiratory infection, probably influenza. Although she remained in bed for one week her cough continued. Shortly afterward the chills and sweats returned, and the cough became worse, so she was sent into the hospital, where it was noted that she had nocturnal chills followed by sweats, always occurring between two and three o'clock in the morning. She also complained of some joint aches. However, at no time did the patient appear ill, and she really had few complaints. The temperature had its daily fluctuations—in the morning usually normal, and at night going up as high as 102°; and the pulse fluctuated directly as the temperature, reaching the rate of 120 per minute.

Physical examination was negative except that the spleen was palpable, but not tender.

Urine showed a trace of albumin constantly; the leukocytes in the uncatheterized specimens ranged from 0 to 10 or 15 per high powered field. On admission the leukocytes were 6,750; polymorphonuclears, 57 per cent; lymphocytes, 39 per cent; large mononuclears, 3 per cent; eosinophiles, 1 per cent; hemoglobin, 66 per cent, and red blood cells, 4,360,000. Leukopenia had been persistent and a relative lymphocytosis developed. Later on, the white count was 4,650; polymorphonuclears, 46 per cent; large mononuclears, 4 per cent, and eosinophiles, 2 per cent. The red blood cells were normal. At one time (about February 16) the large mononuclears reached 11 per cent. Sputa had been negative for tubercle bacillus. On January 31, 1931, *Brucella melitensis* (abortus) was positive in 1:1,280; the Widal negative.

On February 26 the blood was again examined. At this time positive agglutination for bacillus abortus was present in dilutions of 1:640. Also, at this time the Widal test was positive.

The patient stated that when she was two or three years of age her family had typhoid fever, although she was under the impression that she did not have it, nor did she know whether or not she was immunized against

typhoid. At any rate, this present condition was not the clinical picture of typhoid. There have been reported cases of cross agglutination between bacillus abortus and bacterium tularensis, but the writer was unable to find any literature showing such a cross agglutination as shown in this case. However, every attempt was made to rule out evidence of typhoid, and, except for the Widal, other confirming tests for typhoid, such as examination of the urine and stools for typhoid bacillus were negative.

X-rays of the chest were negative, and the nose and throat examination was negative.

In the beginning, the patient was given iodides intravenously, but she developed an allergic reaction, so this was discontinued. A series of acriflavine was contemplated, but because of her reaction, and because acriflavine usually caused a slight reaction, it was not given. Thus, treatment was entirely symptomatic.

There was very little change in the patient's condition during the first three weeks in the hospital. However, from that time until date of discharge there was a steady improvement in her general condition, and the evening exacerbation of temperature became less, so that for the last ten days of her hospital stay the temperature was never above 98.6°. The spleen was no longer palpable, and all the subjective symptoms disappeared.

The patient's home was in the country. It was noteworthy that those with whom she lived (in the country) had similar colds and the patient suspected she contracted her cold from some one of them. No investigation of those associates was made. It was also learned that while in the country the patient drank a great deal of raw milk, and for that reason the herd of cattle which supplied the family's milk was reported to the State Board of Health for investigation.

Case 3.—Mr. S. O., a male office worker, aged 30, was seen at the Clinic on November 3, 1930, complaining of a cough, night sweats, aching in the muscles of the chest and shoulders. He said he had had, just three weeks previous, what a doctor had called the "grippe." During investigation it was learned that he did not use milk to any extent.

Examination showed his temperature to be 101° and his pulse rate 76. His throat was clear; his heart, negative. The lungs showed occasional crackles in the second left intercostal space at the sternal border, but X-rays of the chest were negative. The spleen was slightly enlarged.

The urine was negative. The blood showed 80 per cent hemoglobin; 4,600,000 red blood cells; 10,100 leukocytes; 44 per cent polymorphonuclears; 53 per cent small lymphocytes, with 1 per cent large mononuclears, 1 per cent eosinophils and 1 per cent non-filamented. Red blood cells were normal. *Brucella melitensis* agglutination revealed complete agglutination in 1:160 and partial in 1:640. The Widal test was negative.

This patient lived out of the city and no further record of his progress was maintained.

Case 4.—G. A., a male, twenty-eight years of age, a restaurant cook, was first seen at the Clinic on November 22, 1930, when he complained of weakness, backache,

loss of appetite and constipation. His family and past histories were negative. He stated that he was married and that his wife had had three full term pregnancies, with no history of miscarriage.

Two weeks previous, the patient contracted an upper respiratory infection ("nose and head stuffed up"), with a sore throat, but no cough. He went to bed for one day and then returned to work, but he continued to have the above mentioned complaints. Before his illness his weight was 145 pounds and on the first visit to the office it was 133.5 pounds.

Examination showed his blood pressure to be 110/75; pulse rate, 85; and the morning temperature, 99.4°. A few days later the morning temperature was still 99.4°. General physical examination was negative except for a questionably enlarged spleen. Nose and throat examination showed definite chronic tonsillitis.

The urine was negative except for the presence of bile. Blood examination showed 82 per cent hemoglobin; 4,690,000 red blood cells; 4,800 leukocytes; 40 per cent polymorphonuclears; 56 per cent lymphocytes, and 4 per cent large mononuclears. The Wassermann test was negative.

The patient was put on salicylates and on December 30, 1930, he was much improved. His temperature was 97.6°. Urine showed positive bile; blood showed 3,480 leukocytes, with 26.4 per cent polymorphonuclears, 66.8 per cent lymphocytes and 5.2 per cent mononuclears. At this examination the spleen was definitely palpable. Agglutination for *Brucella melitensis* was 1:640.

When last seen at the Clinic the patient was feeling so well that he did not want to return for subsequent examination; hence, his exact condition at present is not known.

SUMMARY

1. Four cases of undulant fever are reported.
2. The disease is more prevalent than is suspected.
3. In any disease of obscure nature with prolonged fever, undulant fever should be ruled out.
4. The disease is probably transmitted by contact as well as by ingestion of milk.
5. A leukopenia with a relative lymphocytosis seems to be a constant blood finding at some stage of the disease.
6. The use of pasteurized milk will help to prevent the spread of the disease.
7. A case of undulant fever is reported, in which a Widal test, three weeks after onset of disease, was negative, but when re-examined at the end of seven weeks was found to be positive. Other tests were made to confirm a diagnosis of typhoid fever, but they were all negative, so the positive Widal must have been due to some peculiar form of cross agglutination.

8. Much remains to be discovered in the line of therapy. Although vaccines and various dyes have been helpful in certain cases, symptomatic treatment at the present time is the favored line of therapy.

9. A review of the literature on undulant fever is presented.

NOTE: Since the writing of this paper there has appeared in the literature a case of undulant fever also showing a positive Widal but without any clinical evidence of typhoid fever. Schilling et al. in the *Journal of the American Medical Association* for June 6, 1931, reports such a case and ascribes this Hektoen phenomenon to the possibility that the undulant fever infection stimulated not only the specific agglutinins but also the agglutinins for typhoid fever. Gilbert and Colman, in the *Journal of Infectious Diseases* for April, 1930, have discussed the Hektoen phenomenon in detail. With the possibility, therefore, of both a positive Widal and a positive agglutination for undulant fever being present in the same blood a final diagnosis can only be made by means of further laboratory studies, especially by the isolation of typhoid organisms in the stool or urine.

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AGRANULOCYTIC ANGINA*

REPORT OF A CASE

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THE first cases of agranulocytosis in connection with infection were reported in 1904 by Schwartz,¹ and in 1907 by Turk.² From that time until 1922 numerous case reports have appeared in the literature. In that year Schultz³ described a group of cases under the name of Agranulocytosis, which he thought might be a new disease entity. In reviewing these and other cases, Friedemann⁴ in 1923 suggested the name Agranulocytic Angina. The syndrome was characterized by a sudden onset of sore throat, fever, chills and prostration. Later the angina developed into a bleeding gangrenous ulceration of the mouth and throat with a membrane often simulating diphtheria. Enlargement of the liver and spleen, and occasionally some of the lymph glands occurs, all terminating in a fatal pneumonia. Marked leukopenia, sometimes below 1,000, with great diminution or absence of granular leukocytes and relative lymphocytosis, was the characteristic blood picture and source of its name. Since Schultz's article appeared, over seventy-five cases have been reported, some of which showed additional symptoms of ecchymosis, secondary anemia and ulcerating necrosis of esophagus, intestines and genitals, jaundice, coryza, mouth and labial ulcers, variously located abscesses, painful swollen joints, dental caries and root abscesses, mental torpor, etc. Leukopenia and angina are the only findings common to all cases.

The disease has occurred most frequently in middle-aged women. Although the onset is sudden and usually affects those in good health, it may occur in the persons who have been ill sometime with a chronic disease (Klein).⁵ The mortality is extremely high, although a few cases with recovery have been reported. When this occurs, the blood picture rapidly returns to normal. This is often followed in a short time by relapse, ending in death. Harkins⁶ has collected reports of about 150 cases from the literature, 82 per cent of which ended fatally.

After elimination of the doubtful cases, Hueber⁷ finds seventy-nine cases of undoubted agranulocytosis in the literature, sixteen of which were cured. The histories obtained in twenty-five cases show previous severe infectious processes. In fifteen other cases, there had been a feeling of sickness from one to twelve months, with vague symptoms and no evident cause. In twenty-eight cases the bacteriologic examination revealed streptococci, staphylococci, pneumococci and bacillus coli. In the other cases the pathologic-anatomical findings indicate an infectious process, although the bacteriologic examinations were negative.

Autopsy findings were reported in quite a number of the cases, and vary somewhat. Turk's case² showed a bone marrow with an occasional hemorrhagic area and few granulocytes. In Stursberg's case,⁸ the long bones showed fatty marrow, while Blumer⁹ reports a hyperplastic bone marrow. Hueber⁷ states that "the findings in the bone marrow and the negative oxidase reaction of the leukocytes indicated a paralysis of the bone marrow," in his case. Thus, a hyperplastic red bone marrow with normal function except for making granulocytes is characteristic.

In several instances marrow was removed from the sternum at various periods of the disease and showed a decrease in the number of cells, especially in the granulocytic elements, during the height of the disease. The erythrocytic part of the bone marrow seemed unaffected in most of the cases. In those instances in which the spleen or lymph glands were enlarged, the notable finding was *no* evidence of leukemia. Many of the cases showed septic foci in various places such as in the gallbladder, a lung abscess, perityphlitis, follicular abscess in the colon, duodenum, liver and rectum, abscessed tooth, and abscessed lymph nodes.

The blood picture is one of a marked leukopenia with an abscess or marked diminution of the polymorphonuclear leukocytes. The lymphocytes are relatively increased up to 100 per cent.

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Schultz³ states in his original report that there are no specific pathological cells. Very little is said in the various case reports about the morphological characteristics of the blood cells. My own case showed a marked relative lymphocytosis, but the remaining granulocytes and the lymphocytes showed no special morphological changes. Some of the cases reported (Paroulek,¹⁰ Jedlicka¹¹) showed immature granular leukocytes and undifferentiated embryonic mononuclear cells. I found these cases also associated with severe secondary anemia, clinical hemorrhagic phenomena and severe sepsis, and believe they are not true cases of agranulocytic angina, but a type of agranulomyeloblastic septicemia. Most cases only showed a slight secondary anemia and a normal platelet count. The functions of the bone marrow were normal except in the manufacture of granulocytes. Roberts¹² reports normoblasts and megakaryocytes present in their case, but myelocytes and granulocytes are absent or nearly absent.

Aside from the blood picture, other laboratory tests are variable and of little help in diagnosis. Throat cultures, sputum, and sometimes blood cultures have shown streptococcus hemolyticus in many of the cases. The question of whether this is the primary cause or only a secondary invader will be discussed later. Some cases showed staphylococcus aureus abscesses. Occasionally pneumococci and micrococci were cultured from the tonsillar fossæ. Absence of Vincent's spirilla and fusiform bacillus was noticeable.

I offer the following case report, not because it shows anything especially striking, but rather that I feel all cases of agranulocytic angina should be reported, as an aid to help clear up an apparently hazy situation.

CASE REPORT

H. W., a graduate nurse, aged 29, entered Fairview Hospital January 14, 1930. Her chief complaint on entrance was sore throat, fever and general malaise.

About one week before admittance she had had an abscessed tooth lanced. At this time her throat began to get sore. She developed a fever of 103 degrees, with marked general weakness. Difficulty in swallowing developed the next day. The angina and general weakness increased and the fever continued, and on January 13 she was advised by her physician to go to the hospital. At this time he found her with a high fever, marked redness and edema of the throat and soft

palate, a membrane in the right tonsil fossa, a dry tongue and a general appearance of severe toxicity. There was marked swelling and redness at the point where the abscessed tooth had been lanced.

The only thing of interest in the past history was that while doing nursing at the Fort Snelling Government Hospital about one year before the present illness, she had been severely ill with angina and high fever, and showed at that time a marked leukopenia and relative lymphocytosis. She became increasingly ill for a week and then gradually improved and was back at work again in about a month. She had had measles, mumps, pertussis, inflammatory rheumatism in 1922, tonsillectomy and appendectomy in 1918.

The family history was without significance. Her mother was living and well at the age of 77. Her father had died of carcinoma, and one brother of pulmonary tuberculosis.

On entrance to the hospital the temperature was 101.2 F., pulse 110, and respiration 20 to the minute. Physical examination at this time by her attending physicians showed about the same findings as previously recorded, except, in addition, a number of coarse moist râles scattered throughout both lungs, especially in the lower left lobe. Her general condition was worse and she now had an anxious expression on the face.

The urine had a specific gravity of 1.013, showed a few granular casts but was otherwise normal. The w.b.c. numbered 4,000 with 6 per cent granulocytes, 85 per cent small lymphocytes and 9 per cent large lymphocytes. Morphology of cells was normal. A smear from the throat on this day showed streptococcus hemolyticus. X-ray of the lungs showed a pneumonic consolidation in the lower left lobe. On January 15 her condition was about the same and 5,000 units of diphtheria antitoxin were given.

On January 16 there was clinical evidence of areas of consolidation in both lower lobes, and X-ray showed an extensive pneumonic process in the lower left lung, and a beginning similar condition in the lower right, with a temperature of 104.2, pulse of 128, and respiration 32. The leukocyte count on this day was 3,500 with 26 per cent granulocytes and 74 per cent lymphocytes. She complained of sharp, stabbing pains over the heart, but that organ seemed to be normal. Streptococcus Immunogen (P. D. & Co.) in 0.5 c.c. doses was given and repeated daily thereafter. Solvachin, 2 c.c., was also given intramuscularly.

I saw the patient first on January 17, being called in consultation. I found her extremely ill, with flushed face, pneumonic type of dyspnea, dry tongue, and very toxic. There was a very foul odor to the breath. Her throat was red, swollen and edematous with a greenish-gray-yellow membrane extending from right tonsillar fossa up onto the soft palate with ulceration along its edge. There was definite enlargement of the lymphatic glands in the anterior neck. The lips showed herpes and the lungs a diffuse, bilateral bronchopneumonia. She was bright mentally. Otherwise the examination was negative. Temperature 103.8, pulse 124, respiration 32. The blood picture was normal except

the leukocytes were 2,500, 20 per cent granulocytes and 80 per cent lymphocytes. The morphology of cells was normal.

From this time until the date of her death on January 26, her general condition continued to grow worse. The angina increased in severity. On January 20 the whole soft palate looked gangrenous and sloughed off a few days later. On January 24 she became aphonic. Cultures of the throat showed Vincent's spirilla in small numbers. The pneumonic process seemed to clear in some areas, but increased in others. The temperature fluctuated daily between 101 and 104 degrees, the pulse 105 to 124, and respiration 24 to 34. The fluid intake was kept up to 4,000-5,000 daily, with a urinary output of about one-half the intake. The urine at no time showed anything more than a few granular casts. Most of the specimens were entirely clear. Three blood cultures were negative. Daily blood examinations were made which showed a moderate secondary anemia and a persistent leukopenia. The lowest count was on January 18, 1,550, when the patient seemed slightly improved. The following daily counts were: 2,400, 2,500, 3,900, 3,950, and 2,900 (the day before death). The relation of granulocytes to lymphocytes varied. The extremes were 6 per cent granulocytes, 92 per cent lymphocytes, and 26 per cent granulocytes with 7 per cent lymphocytes. There seemed to be no special relationship between the degree of leukopenia and the percentage of granulocytes. There seemed to be no definite relationship between the degree of leukopenia and the general condition of the patient. The leukocytes increased from 2,500 to 3,900 after a direct transfusion of 300 c.c. of whole blood on January 21. There was also slight improvement in the general condition. Another transfusion of 380 c.c. of whole blood was given on January 26, the day of death. Other treatment consisted chiefly in keeping up a high fluid intake, narcotics for pain and rest, diathermy daily to pneumonic areas, citrocarbonate and digitalis, with no definite benefit noted.

Although other conditions, chiefly sepsis, may be accompanied by leukopenia, I feel that this case corresponds closely enough to those described by Schultz to be considered a true case of agranulocytic angina.

Blumer⁹ has recently reported a case of sepsis accompanied by an agranulocytic blood picture in which he believes the sepsis is primary and the blood picture a secondary manifestation. This case, however, did not show primarily the typical mucous membrane lesion (the angina).

Schwartz's¹ case of genito-urinary infection from a ruptured renal or perinephritic abscess showed a terminal gingivitis, enlarged submaxillary glands, and a leukopenia of 600 with no granulocytes, but there was no angina.

Turk's² case showed a leukopenia of 940 with 93.5 per cent lymphocytes but the clinical pic-

ture was quite typical of an acute endocarditis, which was proved by autopsy, and due to staphylococcus.

Cases reported by Stursberg,⁸ Marchand¹³ and McAlpin¹⁴ appeared clinically to be types of lymphatic leukemia with varying grades of leukopenia and high relative lymphocytosis, but autopsy showed them to be various forms of sepsis with no evidence of leukemia.

Klein⁵ reported a case of chronic, multiple arthritis accompanied by gangrenous stomatitis and terminal pneumonia, with a severe leukopenia (175) and no granulocytes found in 200 cells counted.

Hueber⁷ in 1929 reported a case of chronic sepsis with severe phlegmonous necrosing tonsillitis and follicular purulent epityphlitis in the appendicular stump after appendectomy, follicular abscesses in the duodenum, colon and rectum, sporadic embolic abscesses in all of the pulmonary sections, tumor of the spleen, and erythroblastic bone marrow, which showed the typical leukopenia and agranulocytosis.

Other cases in the literature could be cited, but these are sufficient to indicate that there are certain individuals whose bone marrow reacts to bacterial infection differently than usual. Many of these cases are probably not true examples of agranulocytic angina.

In Roberts' case¹² the same patient had an agranulocytic response to one type of infection and granulocytic to another.

Paroulek¹⁰ reports an interesting case showing two attacks of septicemia from different causes but with the same blood picture in both cases: leukopenia with disappearance of mature forms from the peripheral blood and appearance of young cells (myeloblasts) showing complete exhaustion of the bone marrow.

The main question is this: is there always first a sepsis whose toxins exhaust or paralyze the manufacturing plant of the granulocytes in the bone marrow with resulting leukopenia, decreased resistance and death, or is the agranulocytic factor in the bone marrow primary and the bacterial invasion and resulting sepsis secondary? If the latter is true, then agranulocytic angina is a separate disease entity with its pathological origin in the bone marrow.

There are conditions of the bone marrow in which all its functions are depressed, such as aplastic anemia. So-called aleukemic type of

lymphatic leukemia and aplastic anemia may develop terminal infections, especially of the mouth and throat, and show agranulocytosis. At this stage they would be very difficult to distinguish clinically from true agranulocytic angina. But, surely in the case of the former, the depression of the bone marrow cannot be physiological but rather the resulting action of some toxin. It is well known that toxic chemical substances such as benzol, thorium, X-ray and others damage or paralyze the regenerating powers of the bone marrow. Farley¹⁵ reported seven cases of depressed bone marrow function resulting from arspenamin treatments. Wheelihan¹⁶ found an agranulocytic aplasia of the bone marrow following the use of inorganic arsenic in a nine year old child who recovered.

So, it is easy to conceive that toxins resulting from sepsis may in acute cases paralyze, or in chronic or repeated acute attacks, exhaust the regenerative powers of the bone marrow. All the functions, or part only, as the formation of granulocytes, may be affected. Where the excessive virulence paralyzes the creative capacity of the bone marrow, no new cells are passed into the blood. The proportion of these cells in the peripheral blood decreases constantly until there is an extreme leukopenia. If the infection is chronic, it irritates the bone marrow constantly until its creative capacity slowly becomes exhausted, which leads to younger and more immature cells passing into the blood. True agranulocytic angina probably represents the first possibility, namely, acute paralysis of the granulocytic factory of the bone marrow by a specific virus, or a non-specific one, or an unaccountable physiological factor, which completely stops the reaction of the bone marrow and possibly also destroys the cells in the peripheral blood.

Roberts' case¹² is pretty strong evidence that the bone marrow change is primary and precedes the sepsis. There was reduction of the granulocytes to 10 per cent four days before the clinical onset and complete disappearance of the granulocytes from the blood stream two days before the clinical onset. They conclude from this that the disease exists in the bone marrow before it appears in the blood stream, and in the blood stream before it appears clinically. In other words, the disease has three onsets: a marrow onset, a blood stream onset, and a clinical onset. A careful study of their case would certainly in-

dicate that this is true, and affords evidence that the marrow loses its power to make granulocytes for some days before the development of sepsis.

Their patient had two separate attacks about two months apart with daily blood studies which gave them a fine opportunity to study the blood picture between and during attacks. Recovery from the first attack is attributed to the quick onset of sepsis due to the invasion of streptococcus hemolyticus, and resultant awakening of the myelocytic activity of the marrow. It appears from this that secondary bacterial invasion may act as a stimulator rather than a depressor of agranulocytic bone marrow function. Their case also illustrates the fact that great decrease or absence of granulocytes may alone result in serious mental and physical collapse with loss of the natural immunity against infection.

Although most cases succumb to the initial attack, remissions of months or years may occur, with recurrent attacks as illustrated by the cases of Roberts,¹² Rutledge,¹⁷ and the author.

Transfusions seem to offer the most help, but the production of an abscess may prove to be a means of reawakening bone marrow activity. Roentgen ray of the long bones and protein shock therapy have been advocated.

CONCLUSIONS

1. Agranulocytic angina or true agranulocytosis may prove to be a definite disease entity with primary pathology in the bone marrow. Another such case has been reported.

2. Agranulocytosis may be caused by or occur with other conditions such as severe acute sepsis, some chronic infections, poisoning from chemical substances, aplastic anemias, and aleukemic blood conditions.

3. *Absence* of morphological changes in the blood cells, immature leukocytes, severe secondary anemia, and hemorrhagic diathesis, with the *presence* of severe ulcerating angina, prostration, and terminal pneumonia are characteristic of true agranulocytic angina and will help to differentiate it from similar conditions.

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ELECTRIC BURNS AND SHOCK*

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THE rapid development of industrial electricity has been accompanied by an increase in the number of accidents from electricity. This increase, on the other hand, has not paralleled the extensive use of electricity in the household. It has been estimated that 0.5 to 0.9 per cent of all accidents in industry are due to electricity. Power companies have taken care of the increased hazard by the use of safety devices and as a result we find that the vast majority of accidents are due to carelessness.

Contact with electricity either directly or indirectly can cause any of the following:

1. Electric burns of all degrees.
2. Electric shock.
3. Associated trauma such as fractures and wounds from falls, etc.
4. Complications in the form of paralyses either organic or functional.
5. Sequelæ such as scars, deformities, psychoses, neuroses and melancholia.
6. Death.

In the consideration of electric burns I am going to confine my statements to third degree burns, inasmuch as first and second degree burns, such as flash burns, produced as a rule by indirect contact, do not differ materially from similar burns produced by other means. Contact electric burns on the other hand differ from all other types of burns in several ways. First, the heat producing this type of burn is far more intense and as a rule is applied for a short period of time. The temperature of hot cast iron is about 2200°, whereas that of the electric arc is 5500 to 7000°. Second, the relation of the surface spread to the depth of the burn is usually the opposite of other types, namely, an electric contact burn is deep and not so extensive on the surface. A third degree fire burn for example has a widespread area of erythema, an intermediate circle of vesication and a central area of slough. All three zones are ill defined, merge into each other and are seldom very deep. A third degree metal burn is more circumscribed, having a narrow, peripheral ring

of erythema and vesication and a fairly well defined central area of necrosis, almost invariably extending down to the subcutaneous tissue. The electric burn is sharply circumscribed and deep. A small burn may have only a blister which if removed and examined closely has a central white area of necrosis and a very narrow ring of hyperemia about it. Larger burns present a central excavated area which is dry, crisp, bloodless, deep and often charred. This central area is surrounded by a zone of pallor or white necrosis which in turn is surrounded by a narrow zone of hyperemia or edema.

Jaffe states that the effect of a current passing through the skin is twofold: First, in passing through the skin, the electric energy is transformed into heat which alters the skin structure producing the so-called "current marking" which he states is specific and of great diagnostic value. Second, free discharge causes the formation of electric sparks which produce burns of the third degree. We usually have a combination of electric burns and current markings. He describes these current markings as being round, oblong or linear, varying from a few millimeters to several centimeters in diameter. The area is slightly elevated and pale gray, grayish white, yellowish gray or yellow. The hair usually is unchanged and one can often see the imprint of the live wire causing the marking on it. In high tension accidents these markings are often obscured by the burns and are best seen after injury from lower voltages. The bullet wound appearance of some contacts is a typical current marking. It is a round hole extending sometimes to the bone and is the result of sudden formation of steam in the tissues which finds its way out under high pressure. Although these markings are frequent yet electrocutions have been observed without any external sign of injury. Histologically the picture is one of necrosis of all tissue involved in the burn, including at times bone. This necrosis is aseptic as a rule and takes place very slowly without pus formation. In the skin proper the corneal layer is compressed and homogeneous if carbonization has not taken place. Carboniza-

*Thesis read before the Minneapolis Surgical Society at its meeting of March 5, 1931.

tion is usually present only at the positive pole. Elongation of the cells is also noted as is seen occasionally in cauterization. This may be due to drying. The so-called electric edema, which forms immediately, is thought to be due to venous thromboses or local paralysis of the blood vessels.

Jellinek states that blood vessels become friable and brittle. The endothelium is changed and parietal thrombi are attached to the intima. Microscopically there is extensive destruction of the nuclei, especially in the media. Occlusion is common in small arteries. The progressive character of burns is explained by these alterations in the blood vessels at a distance from the site of the injury due to the fact that they are such good conductors.

A peculiar characteristic of these burns at times is their complete painlessness. I recently had a patient who lost one entire hand and had a deep exit burn involving the humerus on the other side and did not require a sedative of any kind. Another feature is the fact that they often-times remain unchanged in appearance for days and even weeks and have very little reaction on the surrounding tissue. Toxic absorption is absent. The patient's general health remains unchanged, even in the presence of large areas of decay. These burns are known to take three to five times as long to heal as other burns, yet they possess a remarkable tendency to heal. After a period of latency lasting days or weeks, the necrotic area, which produces little if any suppuration, drops away spontaneously or can be removed without causing any noticeable irritation or particular discomfort to the patient. I have personally removed necrotic fingers and in one instance a wrist without any complaint on the part of the patient and without anesthesia of any kind.

In addition to the usual treatment for third degree burns in general I feel that the local care of this type of burn should be conservative. Solutions and ointments which help dissolve or hasten the removal of the burn eschar are often used. Such solutions are dilute acetic acid, Dakin's solution, saturated solution of magnesium sulphate and twice normal saline. The latter two have of course no place in the treatment of extensive superficial burns but help separate the eschar from the underlying granulation tissue when used late. Some advocate making incisions

in the charred skin in lattice-work fashion to hasten the chemical debridement and lessen the chances of absorption. Early surgery in this type of burn as a rule is contraindicated. During the first few days or weeks after an electrical accident we are unable to determine whether tissue which at first shows no sign of injury will continue to do so or whether necrosis may not set in later on. Thromboses have been found at great distances from the burn. Also, the extent of the destruction in the media of blood vessels leaving the intima intact, is difficult to determine. As a result the possibility of the ligature holding and the vessels tearing, thereby causing further hemorrhages, must be considered. Therefore, immediate surgery entails the sacrifice of larger portions of tissue than is necessary, or if too small an amount is removed a second operation is necessitated. Conservative therapy on the other hand compensates the patient for the long healing period by assuring him the best results and the best possible chance of returning to his work. I personally believe that most of these victims are better satisfied if they themselves can see the necessity of removing a portion of their anatomy.

The only indications for immediate surgical procedures are:

1. Lumbar puncture when there is an increased intracranial pressure.
2. Hemorrhage.
3. Need for amputation of a limb or part in exceptional cases.
4. Necessity for primary suture of tendons and nerves in rare instances.

Before considering the subject of electrical shock we should first give some attention to a few details which are of great importance in understanding the wide diversity of results from electrical accidents. There are many factors governing the flow of an electrical current through body tissues. These factors are always present whether the outcome is fatal or otherwise. They are:

1. Voltage and tension of the current.
2. Current flow or amperage.
3. Resistance of the body.
4. Duration of contact.
5. Unipolar or bipolar contact.
6. Current path through the body.
7. Condition of individual susceptibility at moment of contact.

Many authors distinguish between high and low tension currents. Urquhart places anything

below 500 volts in one group while Jaffe places the high limit of current at 1,000. Anything above these is considered high tension. Low voltage deaths are common and many physicians forget that the ordinary household current can kill under proper circumstances. The greatest number of deaths occur apparently from contact with voltages between 220 and 1,100 or in the medium zone. High voltage accidents are not quite so apt to cause death as these tensions are more carefully guarded and have a tendency to throw the victim, etc. The number of cycles in alternating current is important, 39 to 150 cycles being the most dangerous. The cardiac muscle is more tolerant to high cycles. Grounding is also more common than bipolar contact in high tension accidents. The current flow or amperage in a given conductor as you all know is its tension divided by the resistance. The amperage, therefore, gives a more accurate account of the action of a current in the body than its tension (voltage). Chapius states that for normal humans direct circuits of from 200 to 250 Ma. and alternating currents from 70 to 80 Ma. are dangerous. Therefore, if the resistance of the skin is less than 1,200 ohms an alternating current of 110 volts can be fatal, since the intensity would then be 90 Ma.

The high natural resistance of the body is our protective measure to the passage of an electrical current. Resistance is made up of the resistance of the skin at the point of entry and exit plus the resistance of the intervening tissue. Skin is surpassed in resistance only by that of bone. In order we can place the various resistances as bone, skin, cartilage, tendon, the various organs and finally the body fluids. Blood vessels are very good conductors. Many other factors enter to raise or lower skin resistance. Thick, dry skin covered by hair has a relatively high resistance. Moisture such as perspiration and wet clothing lower the skin resistance.

The duration of contact is apparently of great importance. Ventricular fibrillation can be set up in a dog in one-tenth to one-third of a second. Respiration can be stopped almost immediately. In considering the relation of current density to duration of contact, it should be kept in mind that the effects on the heart and nervous system seem to be opposite. Currents of low density seem to have a profound effect on the heart if it is in the current path and little effect on the

nervous system. The reverse is true of high density currents. Bipolar contacts are usually more dangerous than unipolar contacts. The current spreads radially from the point of entrance to be collected again at the point of exit from the body. The greatest density is, therefore, at these two points. In unipolar contacts some other part of the body must be suitably grounded for current flow to take place. In bipolar contacts the violent muscular contractions may increase the pressure and duration of contact.

The path of a current through the body is determined by the portions of the body making contact and the resistance of the intervening tissue. Body fluid resistance is low and negligible, as is also that of the blood vessels, and these facts oftentimes determine the course of the current. The current is more apt to go lengthwise through the muscles because of the resistance of the intermuscular fascia to transverse travel. Thus, whether the heart is in the current pathway is of extreme importance. Houston found that 6 amperes of direct current at 115 volts could be applied to a dog's brain without producing death when the path was through the head only, but that only a few tenths of an ampere at this voltage is fatal if the heart is in the pathway. The existence of an idiosyncrasy to electric currents in humans is doubtful. Ventricular fibrillation can be induced easier in depressed and sickly dogs than in vigorous ones. Status lymphaticus, hyperthyroidism, general debility and depressed physical states increase the susceptibility. Surprise and unpreparedness increase the possibility of fatal outcome. These brief facts help us to understand why some men die following low voltage contacts and others are able to resume work immediately after encountering high voltages.

Jaeger states that electric shock is similar to concussion of the brain. Its severity and duration vary within wide limits. Some retain consciousness while others immediately are rendered unconscious. It is said that unconsciousness is immediate in legal electrocution. In industrial accidents it may be of short duration, last for hours or even days and the individual pass finally into a comatose condition, ending in convulsions and death. Others regain consciousness and are able to immediately resume work if no severe injuries have been inflicted. Unconsciousness is more

common in accidents due to currents of high tension than in those due to low voltage. Restlessness is common following electrical accidents. It is in these cases of restlessness, coma, etc., where there is a cerebral edema and an increased intracranial pressure that Jellinek advocates spinal puncture and reports many cases with recovery in what seemed to be otherwise fatal accidents.

The pathological picture is not definitely known. In an autopsy performed following a legal electrocution, Langworthy in Baltimore describes alterations of the Nissl substance in the cytoplasm of the nerve cells and a definite shrinkage of the nuclei. This nerve cell injury was diffuse and occurred particularly in the region of the medulla. Others report chromatolysis of the ganglion cells, rupture of and occasionally shrinkage of the cells. Spitzka and Radasch sectioned brains of five legally electrocuted criminals and reported peculiar areas in the region of the small blood vessels in the brain, having a rarefied zone and a peripheral condensed one. They explained these areas on the basis of a sudden liberation of gas bubbles either by electrolytic action or from excessive temperature. Peripheral nerve changes consist apparently of an irritability and lost conductivity. In severe cases the nerves became friable and yellowish gray or are carbonized. The so-called electric cataract and optic atrophy are really a complication or sequelæ of electrical accidents. These are noted especially when the current has passed through the vicinity of the eyes. Changes in the heart are apparently functional alterations which explains the mechanism of death in electrical shock. Most of the observations are based on animal experiments. In cats and dogs an inhibition takes place immediately with low tension currents followed by a fibrillation when the current is broken. The blood pressure rises slightly and then drops and continues to do so after the current is broken. The fibrillating dog's heart does not recover and hence death is immediate. Severing the vagi does not influence its occurrence and hence it apparently results from a direct action on the muscle fibers or ganglion cells in the heart. Ventricular fibrillation has never been demonstrated in humans but is thought to occur. High tension currents on the other hand do not cause fibrillation. When such a current is closed the heart action stops immediately only to be resumed when

the circuit is opened, if the current is not applied too long. Arterial pressure then rises again and contractions continue. These contractions continue until paralysis of respiration leads to a gradual decline in blood pressure. This respiratory paralysis which is central in origin is one of the common causes of death in electrical shock of high voltage. Spilsbury compares this respiratory paralysis with that following a blow on the upper abdomen, an irritation of the nasal or pharyngeal mucosa or an unexpected submersion in cold water. He believes a sensory stimulation of the nerves of the skin leads to a reflex paresis of the respiratory center. If the center is not charred or destroyed the chances are very great for recovery, as is demonstrated so clearly both in animals and humans through the prolonged use of artificial respiration.

With the exception of the kidney where an albuminuria and a hemoglobinuria is noticed following an electric shock the changes in other organs are negligible. This albuminuria is thought to be due to toxic products from an abnormal protein cleavage and not due to trauma caused by electricity. It has been noted immediately following legal electrocution. This condition clears up in three days where following industrial accident the victim has lived.

Electricity seems to have some effect upon the coagulability of blood. Alternating current apparently hastens it while direct current delays it. A leukocytosis is common following an electric shock.

From the foregoing statements it readily appears that death from electricity, disregarding the cases in which actual destruction of tissues is so extensive as to be incompatible with life, is due to paralysis of the respiratory center or inhibition of heart action. Urquhart adds to this, death by asphyxiation due to prolonged tetanus, which he observed so commonly in animals.

Concerning the treatment of electric shock the only measure holding any hope is apparently artificial respiration. This should be instituted immediately and kept up until the patient survives or rigor mortis sets in. This makes possible the resuscitation of the paralyzed respiratory center. The passive movements of the chest will also produce slight circulation which together with the ventilating of the blood is often sufficient to revive the vital centers. Power companies at the present time carefully instruct their employees in

the proper use of prone pressure resuscitation and physicians called in these emergencies should take advantage of this expert assistance and thereby give the unfortunate victim the greatest possible chance of recovery.

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FACTORS OF IMPORTANCE IN THE DIFFERENTIAL DIAGNOSIS OF CHOLECYSTIC DISEASE AND PEPTIC ULCER*

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CHOLECYSTIC disease and peptic ulcer are probably the most common of the organic causes of indigestion. Failure to recognize the complications of such lesions, or the fact that a peptic ulcer and cholecystic disease are associated may result in advising treatment detrimental rather than helpful to the patient. Such treatment may delay rather than hasten return to health, and it may actually jeopardize the chances of eventual recovery.

If peptic ulcer and cholecystic disease are associated, even the most careful observation in hospital may fail to clarify entirely the diagnosis. In a review of a large series of surgically verified cases of associated cholecystic disease and peptic ulcer we¹ found that in 13.6 per cent of cases of duodenal ulcer there was evidence of cholecystic disease (Fig. 1). In cases of gastric ulcer pathologic changes were found in the gallbladder or bile ducts in 7.8 per cent. In a series of 1,026 cases of proved cholecystic disease 7.1 per cent showed evidence of a peptic lesion. The recognition of disease in the gallbladder and peptic ulcer in association is of obvious significance, because non-surgical methods of treatment under such conditions would usually be quite useless.

By collaboration with the roentgenologist valuable assistance in the diagnosis of peptic ulcer and cholecystic disease is usually obtainable. Peptic ulceration may be demonstrated by the fluoroscope and, by perfection of technic and an increased amount of experience, cholecystography has now become a recognized aid in the detection of disturbed cholecystic function or gallstones.

Analysis of gastric and duodenal contents, tests of the stool, and various methods of ascertaining the unimpeded flow of bile from the liver or gallbladder into the intestines are at our disposal and should be utilized to accumulate all possible data for the diagnosis of the unusual case. The mod-

ern aids to diagnosis, however, must not supplant the carefully evaluated history if grave errors in diagnosis are to be avoided.

It is important to recognize the syndrome usually brought about by non-complicated peptic or cholecystic lesions, as well as the symptoms which may arise if such lesions are complicated. If an attempt is made to formulate a syndrome invariably characteristic of peptic ulcer or cholecystic disease, regardless of the presence or absence of complication, great difficulty may be experienced in satisfactorily explaining a given syndrome.

Changes in the syndrome of peptic ulcer occur with the development of complications, such as disturbances in mechanics, the natural sequence of pyloric obstruction, or the involvement of adjacent organs through chronic or subacute perforation. With the development of complications of chronic perforation or obstruction the general characteristics of the previously established syndrome usually change. The patient himself is aware that his symptoms are different and thus not infrequently is induced to consult his physician. The clock-like precision of the syndrome disappears. Whereas previously the pain was well localized to a small epigastric area it now has become more diffuse, shifting toward the right upper quadrant, upward into the thorax or through to the back. The pain may be more severe and more persistent. The ingestion of food and alkali, which formerly promptly dissipated the pain, now scarcely affects it at all. The element of periodicity practically disappears, there being trouble every day. There are still periods when the symptoms are somewhat less severe, but the long periods of intermission are no more noticeable. There may be intensification of symptoms after meals or vomiting may be the presenting complaint. Should the patient be examined at such a time there might be but little in the history to suggest ulcer and unless a care-

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ful examination is taken an error in diagnosis may result. It is obvious therefore that to make an exact diagnosis it is essential to be able to recognize the symptoms of complicated ulcer.

If a patient is examined during a period when the ulcer is producing slight obstruction, or is in an acute or subacute condition, or if it is penetrating deeply into the wall of the viscus, symptoms may be elicited that may well be mistaken for those caused by cholecystic disease. A carefully taken, complete history, however, will usually disclose that the initial syndrome was different from that presently noted and frequently the period in which such changes occurred can be exactly determined.

The diagnosis of peptic ulcer and cholecystic disease and the differential diagnosis of these two lesions is usually not difficult if carefully controlled laboratory methods are evaluated with judiciously taken anamnesis, and careful chronologic tabulation of the history from the inception of the distress.

Cholecystic disease may manifest its presence in several ways. The symptoms arising from a definitely infected gallbladder or a gallbladder that contains stones may be quite different from those that arise from a mildly diseased organ, giving only reflex symptoms referable to the gastro-intestinal tract. The symptoms of cholecystic disease are more easily evaluated if they are subdivided as follows:

1. Symptoms arising from the inflamed gallbladder itself, which include localized distress, pain, tenderness, and rigidity of the muscles in the upper right quadrant of the abdomen arising from the infected wall of the gallbladder. Involvement of surrounding contiguous organs might intensify or complicate these complaints. An infected gallbladder almost invariably produces symptoms sufficiently definite to permit a diagnosis without difficulty.

2. Symptoms arising from gallstones blocking a bile duct. The migration of a stone into the cystic duct usually produces severe symptoms. Colicky epigastric or right upper abdominal pain is common. Opiates may be necessary to obtain relief. If the stone blocks the cystic duct, chills, fever and jaundice may be added to the symptoms. Coincident with the jaundice, itching may develop, and the coagulation factors of the blood may be disturbed.

3. Symptoms arising as so-called reflex of the

gallbladder. These ill-defined symptoms, including upper abdominal flatulence and belching with nausea, particularly after the ingestion of apples, onions, and fried fat food. Vomiting after meals is present. It should be pointed out, however, that such a syndrome is unreliable in indicating the presence of a diseased gallbladder. Nervous

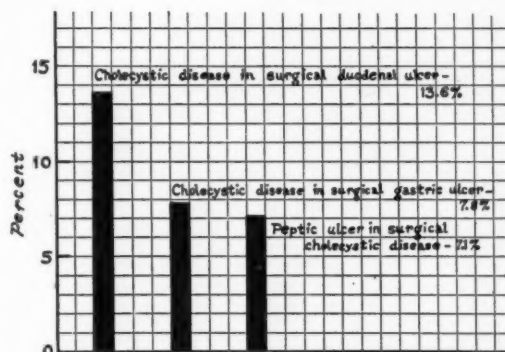


Fig. 1. Incidence of cholecystic disease in surgical gastric and duodenal ulcer, and of peptic ulcer in surgical cholecystic disease.

indigestion, food allergy, constipation and many other conditions have a similar syndrome.

It is a curious fact that whereas the development of complications may be perplexing in the diagnosis of ulcer, the development of more serious disease in the gallbladder usually facilitates diagnosis. The differential diagnosis of the two conditions could, in many instances, be facilitated if, in a careful search of the patient's history, the present syndrome and the initial syndrome are compared. The development of complications or the period in which such complications arose could thus frequently be ascertained.

ABSTRACTS OF ILLUSTRATIVE CASES

Case 1. Cholecystoduodenal fistula.—A woman, aged sixty-two years, had experienced severe upper abdominal pain and jaundice twenty years previously. There had been no further trouble until fifteen months before admission. At this time she had had very severe pain in the upper right quadrant of the abdomen, which penetrated through to the back and was associated with chills and vomiting. There was no icterus or fever. She remained in bed for three weeks and required several hypodermic injections of morphine. Following this on three occasions she noticed several medium-sized stones in the stool. Further attacks of colic, one six weeks and one three weeks before registration, had occurred. There had also been vomiting, moderate flat-

ulence, and residual soreness in the upper part of the abdomen. A diagnosis was made of chronic cholecystic disease.

General and laboratory data were negative except for a leukocyte count of 15,000. At operation a markedly inflamed gallbladder perforating into the duodenum and associated chronic appendicitis were found. Cholecystectomy and appendectomy were performed and the fistula was repaired.

In this case there was no difficulty in localizing the disease to the gallbladder because the history contained definite evidence incriminating this organ. The pain in the right upper quadrant, referred through to the back associated with chills and vomiting, and requiring hypodermics, furnished evidence of cholecystic disease possibly complicated by cholelithiasis. The discovery of gallstones in the stool in addition to the unusual severity of the pain should have made the clinician suspicious of the presence of a cholecystoduodenal fistula. There was nothing in this history suggesting peptic ulcer. Cholecystoduodenal fistula is the most common of the fistulas arising between the biliary tract and the intestines. It is usually caused by the rupture of a stone from the gallbladder into the intestine. This may result after preliminary infection has approximated the walls of the two organs. It is extremely rare for a peptic ulcer to rupture from the duodenum into the gallbladder.

Case 2. Chronic calculous cholecystitis.—A woman, aged fifty years, for five years had had attacks of sharp pain in the right epigastrium, sudden in onset, lasting from half an hour to three hours, and usually relieved by vomiting. The attacks were followed with right infracostal soreness for two or three days. A hypodermic of morphine was necessary on one occasion. These attacks had occurred at intervals varying from one day to one year; however, there had been almost daily mild epigastric distress for five months prior to registration. There had been occasional distress between meals, relieved by eating, and qualitative food distress with much gas and flatulence. There was no history of jaundice or chills and fever.

A Graham-Cole test showed a poorly functioning gallbladder. Gastric acidity was 36 total, and 12 free. The leukocytes numbered 6,200. Fluoroscopic examination of the stomach was negative. At operation the thick-walled gallbladder was found to be buried in a mass of adhesions. Cholecystectomy and appendectomy were performed. When the gallbladder was incised it discharged thick fluid that contained stones and pus. The common bile duct was moderately enlarged and glands along the duct were markedly enlarged. Hepatitis and pancreatitis graded 2 and chronic appendicitis graded 3 were present. The stomach and duodenum were normal.

The history of this case did not include any-

thing which would suggest peptic ulcer; in practically all details it was characteristic of calculous cholecystic disease. The pain of gallstone colic is not as a rule overlooked by the patient in outlining his symptoms. It is usually very severe, and often comes on without warning and frequently stops just as quickly as it began. There is, as a rule, residual soreness in the right upper quadrant of the abdomen. The pain frequently originates in the upper right quadrant and often radiates through to the right scapular area and at times into the neck. It is lancinating and often requires hypodermics for relief. An attack may stop following vomiting. There is often upper abdominal flatulence. Patients observe that their breath seems to be cut off because of intense pain on deep inspiration. In some cases there are only transitory twinges of upper right abdominal pain which, although perhaps severe, are of momentary duration. If the gallstone becomes impacted in the common bile duct, fever, chills, and jaundice are often added to the symptoms of pain. It must be remembered that occasionally a gallbladder packed full of stones does not cause acute pain because the gallstones are so firmly packed that they cannot migrate into the ducts.

Case 3. Acute purulent cholecystitis.—A woman, aged forty-seven years, came to the clinic stating that for six months she had suffered from frequent attacks of dull pain in the epigastrium, which radiated to the back and the right shoulder. The pains had been fairly severe on one occasion, and had required a hypodermic of morphine for relief. There had been soreness and tenderness constantly in the region of the gallbladder. There had been no qualitative food distress, bloating, belching, jaundice or chills. The patient was moderately obese.

General examination revealed some tenderness over the area of the gallbladder, and the edge of the liver was palpable. The Graham-Cole test revealed a poorly functioning gallbladder. The leukocytes numbered 9,900. Cholecystectomy was performed. Acute cholecystitis and one stone blocking the cystic duct were found. The gallbladder was about 5 by 7 cm. in diameter and was full of pus.

In this case the history was again rather clear-cut and the syndrome fairly definitely involved the upper right quadrant. There was constant soreness and tenderness in the area of the gallbladder. There was nothing suggestive of peptic ulcer, and there was no difficulty in making a diagnosis of cholecystic disease.

Case 4. Subacute cholecystitis.—A man, aged forty-nine years, came to the clinic complaining of seven or eight severe attacks of pain in the right upper quadrant for a period of more than two years. The attacks lasted

from four to ten hours, and frequently required hypodermics of morphine for relief. There had been residual tenderness of the right costal margin for one or two days previous to admission. There had been no indigestion in the interval, and no jaundice.

A cholecystogram revealed a poorly functioning organ with multiple stones. General examination disclosed rigidity and tenderness in the upper right quadrant. The leukocytes numbered 6,300. At operation the gallbladder was found to be definitely inflamed with marked edema of its walls and contained multiple stones. There was hepatitis graded 2.

It was not difficult to make a diagnosis in this case. Acute or subacute cholecystitis usually causes complaints which are fairly well referred to the right abdominal quadrant. Tenderness and rigidity may be present in the right infracostal area. The gallbladder may be palpable, and tenderness increases as the palpating hand approaches the region in which the gallbladder is usually found. Although the distress may come on periodically it is not unusual to have the complaint of constant distress in the upper right quadrant which is intensified by the ingestion of food, by walking, or by riding in a car. Flatulence and qualitative food relationship are usually noted. The syndrome lacks the precise regularity of that usually seen with uncomplicated ulcer, although at times the distress is intensified several hours after the meal and in this it may have some similarity to ulcer. An icteric tint to the skin is frequently noted in acute or subacute conditions of the gallbladder, and the icterus index or serum bilirubin may be elevated. The urine may be deeply colored, or stools may be light colored. In such cases a study of duodenal content may be of some aid in diagnosis.

Case 5. Chronic duodenal ulcer.—A man, aged fifty-six years, gave a history of stomach trouble of from five to seven years, consisting of spells of distress lasting from two to five years. Between the attacks there were intervals of freedom from symptoms ranging from five months to three years. The pain usually appeared two or three hours after meals, and reached maximal intensity between the noon and evening meals. Relief had been obtained by the ingestion of food, milk or alkalies, but during the last attack the patient vomited three times before relief was obtained. The pain had been gnawing, and was well localized to a small area in the mid-epigastrium, without radiation until the last attack, at which time severe pain was referred through to the back.

Estimation of gastric content showed slightly elevated acidity but no evidence of retention. Roentgenograms revealed duodenal deformity. A diagnosis was made of duodenal ulcer. At operation a large perforating type of ulcer was found on the anterior wall of the duo-

denum 5 cm. below the pylorus. The ulcer was about 2 cm. in diameter. Posterior gastro-enterostomy was made. The gallbladder was normal.

This case illustrates the type of syndrome usually found with peptic ulcer. The history of periodicity, and pain coming late after meals, relieved by food and soda, combined to suggest the presence of a peptic lesion, and the recent increase in the severity of the pain, referred into the back, suggested the perforating character of the lesion.

Case 6. Complicated duodenal ulcer.—A man, aged thirty-one years, had been troubled for four years with severe abdominal cramps which awakened him at night. The cramps persisted for a few hours, and left residual epigastric soreness for one week. There was no nausea or vomiting, and roentgen-ray examination at that time was negative. Following the attack he was well for several months. In the autumn of the same year he had attacks of gaseous indigestion that usually lasted for several hours. This distress was relieved by the ingestion of food and soda. There was no epigastric pain. These attacks came on periodically until the following spring, when definite burning pain appeared three or four hours after the ingestion of food. This was relieved by taking soda. Roentgenograms then revealed duodenal ulcer. For three weeks he was in a hospital on a non-surgical ulcer regimen. He did well on ambulatory treatment that consisted of diet and alkalies for about twenty months, when the trouble recurred. The symptoms were again relieved by non-surgical treatment. After further recurrence of the trouble the patient came to the clinic. At that time the symptoms were more severe, the pain which previously had been well localized to a small area in the epigastrium now involved a large area and during the more severe exacerbations radiated through to the back; control by medical treatment was poor, and although there was no frank hemorrhage the material expressed from the stomach during lavage was blood-streaked.

General examination disclosed some epigastric tenderness. A diagnosis of subacute perforating duodenal ulcer was made. This was verified at operation. The ulcer had perforated through the lower border of the duodenum onto the pancreas.

It should be pointed out that subacute types of duodenal ulcer give rise to a syndrome which may simulate that produced by cholecystic disease. In 37 per cent of the cases with surgically verified subacute duodenal ulcer recently reviewed in the clinic, a preoperative diagnosis of associated cholecystic disease was made. The qualitative food relationship of symptoms, the gaseous indigestion, and the localization of pain to the upper right quadrant furnished some suggestions leading to the erroneous impression of disease in the gallbladder, despite the fact that the history included evidence of ulcer, and the roent-

genograms gave evidence of a lesion in the duodenum. A carefully taken history with correlation of roentgenologic data, laboratory investigation and gastric analysis usually should furnish sufficient evidence to make the diagnosis of peptic ulcer. If the fact that a subacute or perforating duodenal ulcer may cause an upper right syndrome is borne in mind, an error in diagnosis can often be avoided.

Case 7. Rupture of a gallbladder.—A woman, aged twenty-seven years, had had appendectomy and right salpingo-oophorectomy twelve years before admission. For several years gas and belching had troubled her shortly after meals. In the last year before admission she had suffered four attacks of severe pain of sudden onset in the right upper quadrant, lasting for about a week. In each instance the pain radiated around the scapula, and was associated with vomiting. Hypodermics of morphine were necessary to relieve the pain. The second attack was mild; the third and fourth attacks were severe. In the last attack jaundice appeared.

Marked abdominal tenderness over the right upper quadrant was noted. Masses could not be palpated. The skin had an icteric tint. The temperature was normal. The urine showed a trace of bile, and a few erythrocytes and pus cells. Leukocytes numbered 5,800. The serum bilirubin was somewhat elevated. The blood coagulation factors were normal. Operation disclosed a ruptured gallbladder, an abscess at the base of the cystic notch with multiple stones, and a stone in the common bile duct. The stomach and duodenum were normal. Cholecystectomy was performed. The pathologists reported subacute cholecystitis with perforation, and multiple stones.

In this case a preliminary history suggestive of disease of the gallbladder was present for at least a year prior to the time when rupture of the gallbladder occurred. There had been several attacks of severe pain in the right upper quadrant radiating through to the scapula. The onset of this pain was sudden and presented the characteristics often seen in cases of gallstones. The last attack had been severe and there was definite localizing evidence of peritoneal irritation in the right upper quadrant. The history of the case definitely incriminated the gallbladder as the cause of the symptoms. A complication of some type should have been suspected.

Case 8. Acute perforation of duodenal ulcer.—A man, aged twenty-six years, had had occasional mild upper abdominal distress for two years, which usually came on two hours after meals; this was relieved by food or soda. Four months before admission he had had a severe attack of epigastric distress lasting a week. Three weeks before admission he had suffered a similar, although less severe, attack. One day while he was leaning over washing windows, he was seized with a

sudden acute abdominal pain. He was brought to the clinic and placed in hospital.

The breathing was chiefly costal. The patient's slightest motion seemed to intensify the pain. The respiratory rate was increasing; the pulse rate was normal. There was board-like rigidity of the abdomen and exquisite abdominal tenderness. The point of greatest pain was slightly above the umbilicus. Visible peristalsis was absent. Leukocytes numbered 11,500. A diagnosis of ruptured peptic ulcer was made. Operation, about two hours after the onset of severe pain, disclosed an acutely perforated ulcer on the anterior surface of the duodenum. The perforation was closed.

In this case the symptoms were characteristic of ulcer for several years before rupture took place. Symptoms of disease of the gallbladder rarely simulates symptoms of ruptured ulcer, although occasionally an acutely infected gallbladder will rupture and the resulting peritonitis may cause a mistaken diagnosis. Rupture of the gallbladder, however, except following trauma, is almost invariably a late development in cholecystitis and a carefully taken history should, as it did in this case, present evidence to aid in making the diagnosis. Acute cholecystitis with rupture of the gallbladder is most common in women, and ruptured ulcer almost always occurs in men. We have been told that perforation of ulcer is not infrequently the first sign of such a lesion. It should be pointed out that perforation almost invariably is preceded by a syndrome of indigestion with definite characteristics of ulcer.

Case 9. Chronic calculous cholecystitis.—A woman, aged forty-seven years, had experienced much gas and belching and abdominal distention for fifteen years. The distress usually came on shortly after meals. At times she had noticed slight cramping pains in the epigastrium. These were of short duration, occurring two, three, or four times a week. Often she experienced distressing epigastric fullness at night. There was definite qualitative food distress, fried greasy food causing the most distress. She frequently had vomited.

The Graham-Cole test revealed a poorly functioning gallbladder. The abdomen was tender to the right of the umbilicus and sensitive over the entire right side. At operation chronic cholecystitis with cholelithiasis was found. The stomach, duodenum, pancreas and ducts were normal.

This case illustrates that the diagnosis of chronic cholecystic disease, even though stones are present, may be extremely difficult. If pain is not distinctly referred to the upper right quadrant, if there is no cramping or colicky exacerbation, and only symptoms of qualitative food relationship, burning and vomiting, the diagnosis may be exceedingly perplexing. The cholecysto-

gram has been of unquestionable value in helping to detect cholecystic disease in such cases. In some cases it would be impossible to make a pre-operative diagnosis except through cholecystographic investigation. The so-called reflex to the gallbladder as a cause of indigestion is extremely indefinite. Many of these syndromes have been outlined as being diagnostic of disease of the gallbladder. They may include indefinite epigastric discomfort following meals, flatulence, nausea, vomiting, belching, and bloating after certain types of foods such as onions or apples. We have not found such syndromes reliable in indicating cholecystic disease. Functional disturbances of the upper part of the digestive tract, constipation, and food allergies are likely to give similar syndromes. There should be some hesitancy in assuming that the gallbladder is the cause of such syndromes unless the previous history includes some localized evidence of more severe or more definite disease in the upper right quadrant.

Case 10. Perforating duodenal ulcer with right upper quadrant pain.—A man, aged thirty-five years, stated that for seven years he had had attacks of pain in the right upper quadrant of the abdomen coming in "spells" lasting several days, at the onset occurring three times a year with free intervals, but just prior to admission, twice monthly. The pain was severe, beginning under the right costal margin and radiating along the right costal margin to the back. One year after the onset the appendix was removed and the gallbladder drained without relief. Finally, six months prior to examination at the clinic a diagnosis of gastric ulcer had been made. A diet and alkali powders relieved the pain until two weeks before admission, when the patient noticed that these measures were inadequate. The pain was quite severe and now began to radiate through to the back. Hypodermics of morphine were given. On one occasion blood had been vomited.

There was slight tenderness under the right costal margin and over the right lower quadrant. Masses were not palpable and there was no rigidity. The urine was normal, the leukocytes numbered 9,500, the Wassermann reaction of the blood was negative, and the gastric acids were 90 for total and 70 for free hydrochloric acid. Roentgen-ray examination of the gallbladder according to the Graham-Cole method showed a normally functioning organ. The fluoroscope revealed duodenal deformity. At operation an ulcer of the subacute perforating type was found on the anterior surface of the duodenum below the pylorus. There were no stones in the gallbladder. Posterior gastro-enterostomy was performed.

This case illustrates the fact that subacute perforating duodenal ulcer may produce a syndrome closely simulating that caused by cholecystic disease. The pain and distress may be entirely in

the upper right quadrant. There is, however, usually something included in the history, such as food ease, soda ease, or distress, reaching maximal intensity several hours after the meal, which suggests a peptic lesion. If the history includes hemorrhage, such as was noted in this case, the diagnosis is made more easily; otherwise roentgen-ray data may be the determining factor.

Case 11. Duodenitis and a history suggesting a lesion of the gallbladder.—A woman, aged forty-five years, complained of having had stomach trouble for ten years. Attacks lasted two or three weeks and occurred two or three times a year. The distress ranged from mild to definite pain in the midepigastrium and occasionally this was referred to the back. The distress came on from half to one or two hours after meals, always with much gas. It usually followed the ingestion of fried greasy food. There had been no jaundice, no colic, and no vomiting. Soda and food occasionally relieved the distress.

The systolic blood pressure was 120 and the diastolic 70 in millimeters of mercury. There was slight tenderness in the right upper quadrant. The urine was normal, leukocytes numbered 7,700, and the gastric analysis gave total acidity 48 and free hydrochloric acid 34; the total quantity aspirated was 120 c.c. Roentgenograms of the stomach were negative. A diagnosis of chronic cholecystitis was made. At operation a normal gallbladder and a normal-appearing liver were found. The stomach was somewhat thickened and dilated. Diffuse duodenitis was noted, and the pylorus was found to be hard, firm and sclerosed. Pyloroplasty and appendectomy were performed. The pathologists reported duodenitis and chronic catarrhal appendicitis. Convalescence was without incidence and thus far the patient has remained well.

This case demonstrated that duodenitis may closely simulate a syndrome caused by cholecystic disease. Usually, however, there are certain characteristics, such as food ease, soda ease, periodicity or distress coming late after meals, which offers some assistance in diagnosis. A recent review in the clinic of a large series of surgically verified cases of duodenitis suggests that duodenitis, even if unassociated with ulcer, can be a formidable lesion of definite clinical significance.

SUMMARY

Complicated cholecystic disease usually is productive of a syndrome which so definitely focuses attention to the region of the gallbladder that diagnosis is made without difficulty.

Subacute duodenal ulcer, duodenitis, or subacute perforating duodenal ulcer frequently produces a syndrome which may simulate that caused by disease of the gallbladder. The pain may be

in the right upper quadrant, referred upward over the region of the liver, and there may be associated flatulence and qualitative food distress. The history, however, usually includes sufficient characteristics of ulcer, such as distress late after meals, food ease, soda ease, and periodicity, to make diagnosis possible.

In a review of a history it is important to obtain information regarding the present attacks of dyspepsia and to compare these with previous gastro-intestinal exacerbations.

By the judicious evaluation of data obtainable throughout the history of the case, roentgenologic investigations, and the laboratory aids such as icterus index, serum bilirubin, and occasionally studies of duodenal contents, the differential diagnosis of cholecystic disease and duodenal ulcer usually is possible.

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CONCERNING LIMITATIONS OF THE CLINICAL SIGNIFICANCE OF LOW BASAL METABOLIC RATES*

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ALTHOUGH, with the advent of simplified methods, clinical calorimetry has become a common procedure, its value in diagnosis and as an indication for therapy is proportional to an appreciation of all the factors that influence the energy exchange of the body. Recent reports by Thurmon and Thompson,⁵ and Remington and Culp,⁴ tend to show low basal metabolic rates are not uncommon in individuals who are apparently normal or who have only minimal functional disturbances without myxedema. A preliminary report of a study of a group of young adults which shows similar results is included in this paper.

On the other hand the clinical significance of increased heat production is usually clear, as the diseases (other than hyperthyroidism) that have increased basal metabolism by their nature are not usually confusing; for instance, leukemia, polycythemia and acromegaly are not common and have, of course, other and better diagnostic criteria. In addition, pyrexia should be kept in mind for, in almost all infections, increases of basal metabolism of approximately 7 per cent per degree F. occur.

While the usually accepted range of normal variability is within plus or minus 10 per cent, it should be mentioned that the Aub-DuBois standards in common use are approximately 4 or more too high according to Krogh.³ Myxedema, with rates from minus 25 to minus 40, is usually outspoken in its manifestations and need not be considered here. The glandular dyscrasias other than myxedema or Fröhlich's syndrome and other hypopituitary states and Addison's disease are not common, and have outstanding physical characteristics; all may have a reduced metabolism. However, the establishment of a diagnosis of hypothyroidism without myxedema requires careful study of each individual case beyond obtaining a laboratory report of a basal metabolism of from minus 15 to minus 25 per cent. The interpretation must include

consideration of other conditions, aside from diminished thyroid function, that are associated with lower metabolism. Benedict⁴ showed that the basal metabolism in a starving individual fell 30 per cent, and that² in a group of young men on a low caloric diet (approximately 1,400 calories for three weeks) the basal metabolism fell 18 per cent. This reduction is probably due to a protective mechanism on the part of the body, not, however, a primary thyroid influence. While starvation is rare, the physician frequently sees under-nourished individuals who, for various causes, at times imaginary, have restricted their diet to a point of caloric deficiency. Although in under-nutrition thyroid deficiency is not primarily present, if the condition is of such long standing that there may be secondary alteration of thyroid function, the use of thyroid extract has been suggested in treatment in combination with increased food intake.

Since muscular inactivity tends to depress the basal metabolism it should be remembered that in invalidism, as in certain anemias and arthritic conditions with long periods of inactivity, there may exist secondary lowering of basal metabolism.

Keeping in mind, then, that physiologic and pathologic states, other than a primary change of thyroid function, tend to depress the basal metabolism of the body, the physician will be in a position to evaluate a reduced basal metabolism in individuals without myxedema. It presupposes that a complete study of the case has been made, that chronic infection, including tuberculosis, and anemias or other chronic states with invalidism have been excluded or evaluated and that there is no demonstrable cause of symptoms. After exercising such caution, there remains a group of cases with fatigue, exhaustion, low energy level, anemia, unexplained dizziness, sensitivity to cold, drowsiness, obesity without overeating, sterility and menstrual disorders, in which the therapeutic trial of thyroid extract is justified even though physical signs in the form of skin and hair changes are minimal or not demonstra-

*Presented before the Hennepin County Medical Society, February 18, 1931.

ble. While a number of these individuals may respond well to treatment, there will be differentiated by this therapeutic test the group without improvement and presumably without any thyroid deficiency. This group is worthy of further study. Undoubtedly some of them have a nutritional deficit sometimes on an infectious basis which has not been evaluated. Although under-nutrition itself tends to depress basal metabolism, it is somewhat paradoxical that under-nutrition may be, and often is, due in some degree to the high rate of energy exchange characteristic of hyperthyroidism. In obesity, normal values usually obtain although there is a tendency for some individual cases to have low basal metabolism.

Benedict apparatus was used in 134; the McKesson in 20; usual standard basal conditions were obtained and Aud-DuBois standards were used.

It is seen that over one-fourth of this group had low basal metabolic rates. While in some of these under-function of the thyroid may be present as indicated by response to substitution therapy, in many others no such under-function was established. A study is being made of this group, in order that the proportion of normal individuals may be established from the results of complete routine examination.

In conclusion, the increased clinical use of the determination of basal metabolism makes im-

TABLE I

Total No. of cases	M.	F.	B.M.R. below — 10 per cent		B.M.R. above + 10 per cent	Total per cent with B.M.R. below — 10 per cent
154	41	113	12	31	4	27.9

Some of the group with low basal metabolism appear to be entirely normal. Is their low metabolism comparable to the physiologic slow pulse, low temperature and low blood pressure of certain individuals? In such individuals studied after the development of some complaint, the normality of a low basal rate for the individual should be kept in mind. Whether some of this group will later develop hypothyroidism or myxedema is a question. Against this, evidence exists that hyperthyroidism is a precursor of myxedema in a certain percentage of cases where hyperfunction of the gland leads later to retarded or absent activity.

A study is being made of a group of individuals without marked physical defects. Determination of the basal metabolic rate was made often on account of rather minor non-capacitating disturbances of function, as overweight, underweight, menstrual disturbances and fatigue, and also on account of colloid goiter. None had myxedema. Multiple determinations made on a group of 155 students, aged 17 to 35, at the University of Minnesota, are referred to. The Roth-

perative a critical attitude in its interpretation as a diagnostic aid. It must be kept in mind that under-nutrition and inactivity tend to depress the basal metabolism and that certain apparently normal individuals have the basal metabolism below normal limits according to standards and procedure in common clinical use. The findings in a group of 155 young adults with good working capacity show that in 27.9 per cent the basal metabolic rates were below normal.

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THE ADHESIVE BANDAGE IN TREATMENT OF VARICOSE ULCER*

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THE injection treatment of varicose veins has become established. Application of an adhesive bandage, combined with injection, or application of an adhesive bandage only, is proving efficacious in the treatment of varicose ulcers, which are the most common ulcers of the lower extremity. By directing attention to those ulcers of the lower extremity which are associated with arteriovenous fistula, it may be seen why the use of an adhesive bandage would be of value in the

arteriovenous fistulas of the lower extremity occur below the arteriovenous opening. If a tight bandage is applied in such a case so that the vein at the point of the fistula is compressed and blood is forced to pass through the capillaries, healing rapidly follows. Recurrence eventuates if the bandage is discarded for any length of time.

In varicose ulcers of the lower extremities conditions as follows are often present:



Fig. 1. Before treatment.

Fig. 2. After treatment.

treatment of varicose ulcers. In order that oxygen may be properly distributed to the extremity, the blood must pass through the capillaries before reaching the venous system. In the arteriovenous fistula the blood does not pass through the capillaries but is emptied directly from the artery into the vein. Consequently, and logically, ulcers which develop in connection with

Group 1.—Huge, tortuous veins which have permitted slowing, complete stoppage, or even reverse flow of blood, cause improper oxygenation, as in the arteriovenous fistula, and ulcer results in many instances. If a tight bandage is applied or the veins are injected in this type of case, healing results because the stagnant pool of poorly aerated blood has been eliminated and circulation has been formed through the capil-

*Submitted for publication May 5, 1931.

laries. In this particular group if the ulcers are large and markedly infected, we suggest bandaging for two or three weeks, after which partial or complete healing will have taken place and the infection and edema will have definitely decreased. Injection of the veins may then be carried out with complete and permanent healing of the ulcer.

Group 2.—Much the same condition exists in these cases as in those of Group 1 except that the tortuous or obstructed veins are in the muscles and therefore are not visible and, in many instances, not palpable. In this type of case, obviously, treatment of the ulcer may be carried out by means of bandaging alone. Occasionally, after the ulcer has healed and the bandage is discarded, premonitory symptoms of recurrence appear, such as eczema, cyanosis, and edema. Bandaging again should be resorted to, and at irregular intervals, as indicated.

The use of Unna's paste casts have been of much value in the treatment of varicose ulcers. Any compression bandage is of benefit in the treatment of this condition. The difficulty with the bandages used heretofore has been that they did not remain snug; thus recurrence of the engorgement of the tortuous veins was permitted and the purpose of the bandage more or less defeated.

The two cases presented at the end of this paper illustrate each of the two groups of varicose ulcers and the results obtained following the use of an elastic, adhesive bandage. In case 1 the bandage was supplemented by injection. In case 2 the bandage only was employed.

The elastic, adhesive bandage may be applied directly over the ulcer or a piece of plain gauze may be placed over the ulcer before the bandage is applied. It is well not to change the bandage for several weeks, particularly if the ulcers are large, unless the patient experiences discomfort, which is rare. However, a new bandage may be applied every week or two without hindrance to healing. If the limb is markedly swollen, the first bandage should be applied when the swelling is at a minimum; for example, in the morning. Discomfort may be experienced for an hour or two, after which comfort and freedom from symptoms are the rule. In huge ulcers it is obvious that several weeks may be required for complete healing.

A skin graft, followed by the immediate application of a bandage on an ambulatory patient, has been of considerable value. The graft is applied as follows: Five or six small strips of skin, 1 to 2 mm. wide and 10 or 12 cm. long, are taken from the thigh. By the aid of a fascia needle these threads of skin are sewed into the ulcer in lattice fashion, without care or caution as to the



Fig. 3. Before treatment.

Fig. 4. After wearing bandage nine days.

position of the epithelial surface. This method can readily be carried out in an office under local anesthesia. In order to obtain a good result the graft must be used on a granulating surface.

REPORT OF CASES

Case 1.—A woman, aged fifty-four years, had a large varicose ulcer on the inner aspect of the right leg. There were several medium-sized, tortuous veins over the posterior aspect of the leg. An elastic, adhesive bandage was applied over the entire extremity. The bandage was replaced three times during a period of eight weeks, at the end of which time the ulcer had healed completely. Four injections of quinine dihydrochloride and urethane (dose 2 c.c.) were given after completion of the bandaging treatment (Figs. 1 and 2).

Case 2.—A man, aged forty-four years, had had multiple ulcers over the outer aspect of the lower part of the left leg and ankle for six months. During the last three weeks retraction of the heel and pain had made it necessary for him to resort to crutches. An elastic, adhesive bandage was applied over the foot and lower part of the leg. Relief of pain was experienced in a few hours and he could walk comfortably without the use of crutches in five days. The bandage was removed in nine days, at which time the ulcers were completely healed (Figs. 3 and 4).

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RETROCECAL APPENDICITIS*

HERBERT BUSER, M.D.

St. Paul

IF the appendix lies behind the cecum, and is consequently hidden from view upon opening the abdomen, it is called a retrocecal appendix. Such an appendix was found in 17 per cent of all appendectomies at the Boston City Hospital, and in 25 per cent at the Johns Hopkins Hospital, according to their recent reports. It occurred twice as often among men as among women. It was adherent and kinked twice as frequently as the normally situated appendix. The mesoappendix was usually shorter than normal, and sometimes entirely lacking. In the latter case, the appendix lay beneath the peritoneum of the cecum, commonly between the cecum or ascending colon and the psoas muscle which forms the posterior abdominal wall at this point. An appendix so located is retroperitoneal as well as retrocecal, and occurred thus in 2 per cent of all cases reported in these statistics. Most of the appendices "not found" are of this sort. Frequently an originally free retrocecal appendix may be so concealed by an adherent cecum that it will be erroneously considered to be retroperitoneal. A retrocecal appendix may be straight, kinked, or curled up. It may point directly upward, or to one or the other side.

The reason for the frequent occurrence of a retrocecal location of the appendix lies in the latter's embryological history. In a very early embryo the primitive gut is a straight little tube of even caliber. It soon outgrows the capacity of the abdominal cavity and forms a loop which extends part way into the umbilical cord, suspended by a long mesentery. When, in the third fetal month, the gut returns into the abdomen, it can crowd in only by forming numerous smaller loops. The lower portion, destined to become the colon, now forms a semilunar loop, somewhat larger than the many smaller loops of the upper portion representing the small intestine. This colonic loop then rotates around the small intestine in a counter-clockwise manner, carrying with it its mesentery like an opened fan. In the fourth month the primitive cecum lies in the

upper right abdomen under the liver. From then on until birth there occurs a gradual descent of the cecum into the iliac fossa. During this time the lower end of the cecum lags in growth and becomes the appendix. Also during this period of descent, the mesentery of the cecum and colon becomes adherent and fuses with the parietal peritoneum of the abdominal wall behind it. Thus it happens that the posterior wall of the cecum descends more slowly than the free and unhampered anterior wall, and a certain amount of curling backward of the cecum is quite the usual thing. It is surprising, therefore, that not every appendix is retrocecal. If, as occasionally happens, the tip of the appendix becomes adherent to the posterior abdominal wall in the region of the right kidney, as the cecum descends, a true extraperitoneal appendix is the result.

Acute inflammation is relatively more common among retrocecal appendices than among those normally situated. Especially true is this where the appendix is actually retroperitoneal. Aschoff states that the retrocecal position makes emptying of the appendix difficult, and at the same time makes obstruction of the blood supply easy, because of the bend that is present, opposite to the general direction of peristalsis and circulation. And for this reason inflammation and gangrene are common. Howard Kelly thinks that in cases of retroperitoneal appendices the friction against the psoas muscle in walking may cause an irritation not experienced by a free appendix. Small found perinephritic and subphrenic abscesses more prevalent in cases of appendicitis of the retrocecal variety. This seems logical when one considers the close proximity of the right kidney and the looseness of the connective tissue behind the peritoneum in that vicinity. On the other hand Quain and Waldschmidt, reporting a thousand cases of appendicitis, found the retrocecal type less dangerous than the average, for the simple reason that the retrocecal appendix lies in an out-of-the-way corner as far as the general peritoneal cavity and its contained viscera are concerned, where it can more quickly and more easily be walled off.

*Read before the Ramsey County Medical Society, St. Paul, April 27, 1931.

The clinical picture of retrocecal appendicitis is unusual only in that small percentage of cases where the appendix is not free and pendulous but is either retroperitoneal or enclosed in a pocket behind a posteriorly adherent cecum. However, in these few instances we encounter symptoms out of the ordinary. On the one hand, as Behan has pointed out, the peritoneal irrita-

tion of the iliac crest. Farther anteriorly the gas filled cecum and colon will overlies the abscess and tympany on percussion is more often found than dullness.

From a practical standpoint the most important question about retrocecal appendicitis is that of differential diagnosis. Occasionally the possibility of a gallbladder disease may enter into

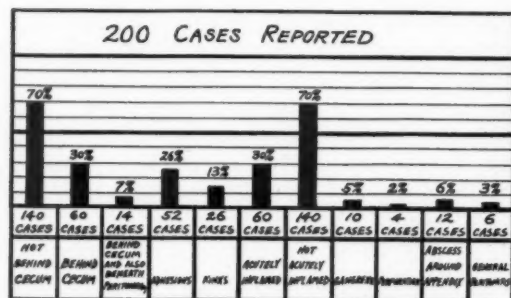


Fig. 1.

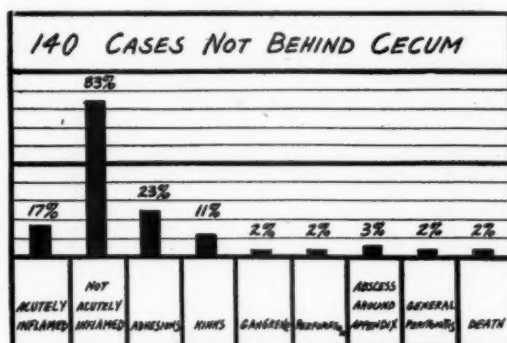


Fig. 2.

tion of the sympathetic nerves is minimal. Hence, the midabdominal or epigastric ache, accompanied by nausea and vomiting, is not as prominent as it is in an ordinary attack of appendicitis, and may even be absent in a frank retroperitoneal case. On the other hand, the irritation of the sensory nerves of the abdominal wall takes place more promptly. Local pain and tenderness, and muscular rigidity, therefore, become early symptoms; in fact, they frequently are the first to appear. Their location also is different from that in ordinary appendicitis. Due to a higher and more posterior nerve irritation the pain, tenderness on pressure, and muscle rigidity are found more commonly in the flank or lumbar region rather than in the lower right quadrant. And to confuse the picture still more there exists a tendency for the pain to radiate toward the inguinal region, a circumstance which Mackenzie explains upon the basis of the radiation of the nerve fibers which supply the region of the kidney and ureter. Bruno Cohn draws our attention to a symptom quite characteristic of a retrocecal retroperitoneal appendicitis, due to an irritation of the psoas muscle. The patient will lie with the right thigh flexed in order to favor the psoas, and an attempt to extend the thigh causes increased pain. If a case progresses to abscess formation, the dullness and resistance to pressure are located more commonly in the flank between the rib margin and

the picture. Close analysis of the previous history, and the radiation of the pain, together with Graham-Cole cholecystography if time permits, will usually clear up the uncertainty. More frequently we must differentiate retrocecal appendicitis from right urinary disease, particularly from acute pyelitis. Especially now, when our attention is drawn constantly to the numerous unnecessary appendectomy scars in cases of right urinary trouble, we must beware of the rare but real possibility of making the opposite blunder of mistaking a retrocecal appendicitis for a pyelitis. Guy Hunner emphasized this danger when he reported cases in which inflamed appendices lay behind the ascending colon and near the ureter. In these cases he found lumbar pain radiating into the groin and thigh, accompanied by frequent and burning urination, and found blood and pus in the urine. Such symptoms are undoubtedly very misleading. In discussing the diagnosis of these cases, H. W. Carson brings out a few differences which should be kept in mind. Acute pyelitis usually begins with chills followed by high fever, both of which symptoms are very unusual in early appendicitis. Another distinguishing point is the contrast between the subjective pain and the objective tenderness. In pyelitis the patient complains of great pain but is

not very tender on pressure, whereas in retrocecal appendicitis the pain is only moderate while the tenderness is great. With this greater tenderness goes a muscular rigidity which is rarely found in pyelitis. Of course, if time permits, pyelography and intestinal radiography may simplify the problem. However, if, after a careful study, there still exists an honest uncertainty, it is wisest

the retroperitoneal group as in those normally situated.

3. The retrocecal position of the appendix was found three times as frequent among the cases of acutely inflamed appendix as among the non-acute, and the retroperitoneal position was found seven times as frequent among the acute cases as among the non-acute.

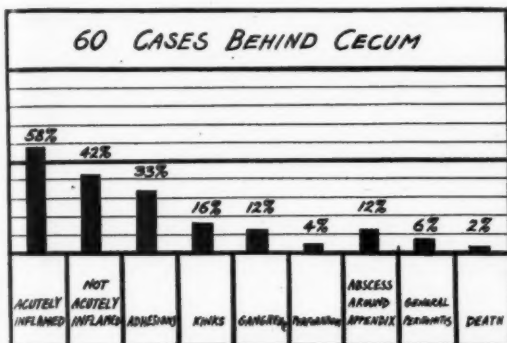


Fig. 3.

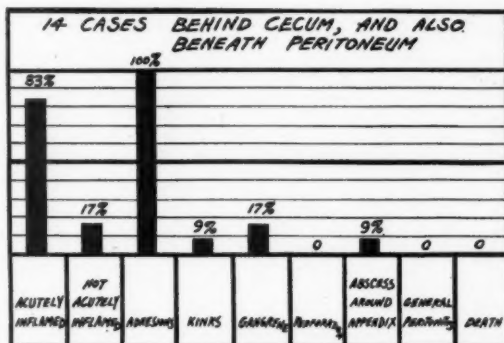


Fig. 4.

to operate, in view of the possible greater danger of an overlooked retrocecal appendicitis.

I wish to present an analysis of the anatomical and pathological findings in two hundred consecutive appendectomies. This series includes cases operated upon primarily for disease of the appendix, and also cases in which the appendix was removed secondarily in the course of operations for other abdominal conditions. For the sake of brevity and clarity I will present this analysis in the form of graphs, to be thrown on the screen.

SUMMARY

1. In 200 consecutive appendectomies a retrocecal position of the appendix was found in 30 per cent of the cases, and a retroperitoneal as well as retrocecal position was found in 7 per cent of the cases.

2. Acute inflammation of the appendix was found to be three times as frequent among the retrocecal group and five times as frequent in

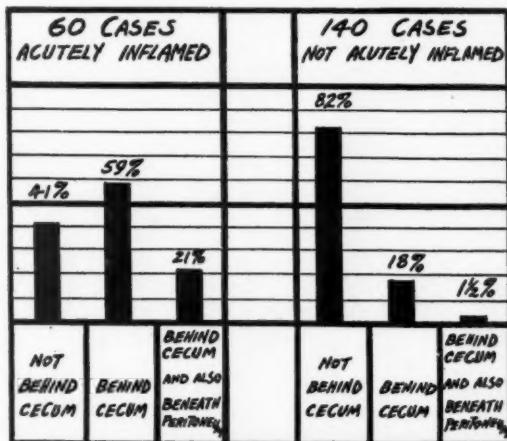


Fig. 5.

Conclusion.—A retrocecal position of the appendix, especially when it is also retroperitoneal, is an important factor causing the appendix to be susceptible to acute inflammation.

COMPRESSION FRACTURES OF THE VERTEBRÆ

M. H. TIBBETTS, M.D., F.A.C.S.

Duluth

IN order clearly to distinguish between a compression and a comminuted fracture we may define the former as a crushing injury which results in a lessening of the vertical height of the body. Most of this occurs at the anterior portion of the bone and forms a so-called "wedge deformity." As a rule, the posterior area remains intact and offers a point of leverage to be utilized in treatment. This will be alluded to subsequently. This fracture is really a telescoping of a portion of the body as contrasted with dissolution of the vertebra into several fragments, unimpacted, as seen in the comminuted fractures.

The compression fracture is usually brought about by a "jack-knifing" or acute flexing of the spine. The resilient intervertebral discs are unable to absorb all of the force and the trabeculae of the bone telescope with each other. Falls of varying heights may be the immediately inciting cause. Even being thrust into a sitting position unexpectedly has resulted in a compression. Auto collisions are increasingly responsible for some of these lesions. The mechanism here is again acute flexion—probably with feet braced and body thrown forward by the sudden impact. Some are due to direct crushing blows, as in cave-ins in a mine or a falling roof.

Regarding sex, women are appearing more frequently in the list with the increasing use of the automobile. Before this, males predominated, owing to their more frequent exposure to hazards in line of their occupations. Adults seem to have a corner on the malady, and adults past middle life subjected to the same hazards are much the more susceptible.

There are no pathognomonic symptoms. They are simply those resulting from any acute injury and are pain on attempted motion, tenderness on direct pressure over the lesion, and increasing pain in the sitting or upright position.

The most serious complication is, of course, varying degrees of injury to the spinal cord, from slight edema to complete severance. Regarding the next point, I am not entirely convinced as to whether it should be listed as a complication or a

symptom. Indeed, it has appeared so uniformly in my own series of cases that I have almost concluded that it must be a constant factor. I refer to the distressing abdominal distention. It is painful and most resistant to remedial attempts.

Roentgenographs taken in the anteroposterior and lateral views clinch the diagnosis. Unfortunately, they are too frequently omitted and too many of these lesions go unrecognized. Wallace¹ goes so far as to state that 50 per cent are not discovered until secondary symptoms cause increasing disability, and increasing deformity impels the attending physician to seek roentgenologic evidence.

As will be shown later, inasmuch as with early treatment practically normal restoration of the form of the vertebra can be accomplished, a strong plea is here made for more careful search for these lesions. The lateral X-ray view is all-important, and if taken more frequently fewer disabling backs will come up for compensation adjustment.

Tuberculosis of the spine in its typical form simulates the wedge deformity so closely that superficial scrutiny may confuse the two. The tuberculous lesion usually causes destruction of the intervertebral disc not seen in fractures. In general, it causes much more atrophy of the body along with actual destruction and there is usually evidence of abscess formation.

Rickets, giving rise to a rounded adolescent kyphosis, usually results in wedge shaped vertebra, but these are most frequently multiple and show no widening of the body as is frequent in fracture.

The wedging seen in osteoarthritic spines and the collapse of a carcinoma metastasis must be kept in mind. The former offers real difficulty, especially if there is a history of injury. Unless seen soon after the accident, when definite evidence of fracture can be seen, differentiation is often impossible.

TREATMENT

We come now to the main point of this presentation—the treatment.

¹From the Duluth Clinic.

It is only within the last few years that much has been said or written regarding the correction of these deformed vertebræ. Davis¹ of Erie, Pennsylvania, has furnished an excellent bibliography, citing some seventy-five different articles. He described a method by which these crushed

with traction on the feet lift the pelvis entirely free from the table. While in this position gentle manipulation is performed at the site of the deformity, pressing downward on the deformed vertebra to bring it back into its proper alignment. After this a long posterior plaster shell is

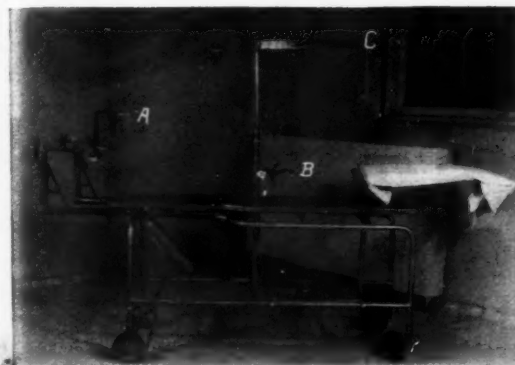


Fig. 1. The Hawley table. (A) Foot attachments for counter-traction; (B) Sacral rest; (C) Overhead bars.

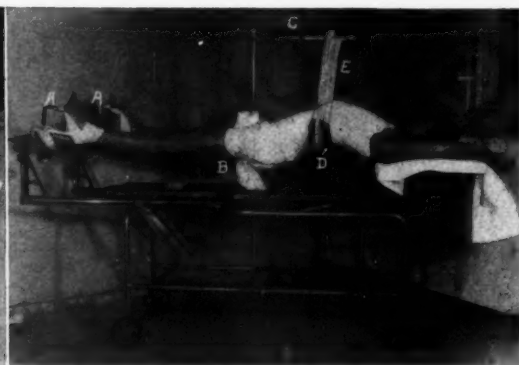


Fig. 2. Patient on Hawley table, showing: (A) Foot attachments; (B) Sacral rest; (C) Overhead bars; (E) Muslin bandage lifting spine into hyperextension; (D) Heavy saddle felt to protect against pressure.



Fig. 3. Same as Figure 2 from a different angle.

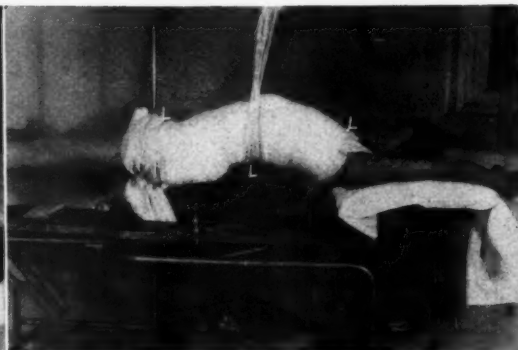


Fig. 4. Showing the points of leverage to maintain hyperextension.

bones could be restored to practically their original shape. The basis of his treatment is dependent upon hyperextension of the spine. The lateral articular processes, the posterior portion of the body of the vertebra and the lateral masses, constitute a fulcrum by which the crushed vertebra is pulled apart. The strong anterior ligament of the spine prevents too great an extension and also acts as a limiting membrane, according to Davis, which helps in splinting the crushed fragments and in holding them in place.

The method used by Davis is to anesthetize the patient, place him prone upon a table, and then

applied, the patient then turned on his back after the plaster has sufficiently hardened, and an anterior shell (holding the spine in hyperextension) applied.

Dunlop and Parker² of Pasadena, California, later described a manipulation to accomplish the same thing, which they developed entirely independent of Dr. Davis' method. Their procedure requires five assistants besides the operator: two men hold the feet, two others hold the upper end of the patient by a sheet folded and passed under the chest and arms, while the operator and his assistant hold a folded sheet under the site of the

fracture, the patient first being thoroughly anesthetized and laid on his back. Then the four men (two at the head and two at the feet) throw the patient upward, exerting strong traction all of the time, and then allow the body to drop down and be caught by the operator and his as-

to assume its normal position through hyperextension. After this manipulation a plaster cast is applied with the back in the hyperextended position.

Still another procedure has been described by Rogers³ of Boston, which does not require the

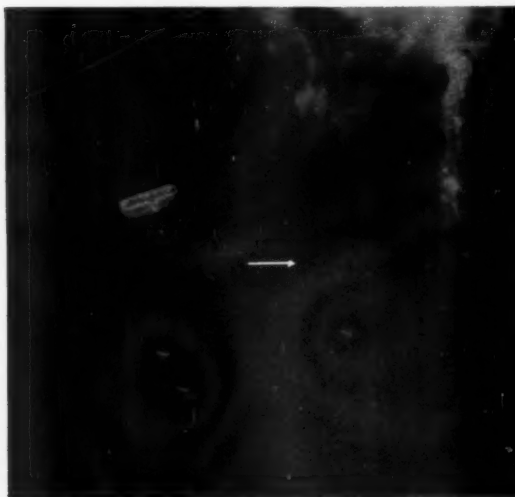


Fig. 5. Case 1. X-ray before reduction, showing compression of eleventh thoracic vertebra.

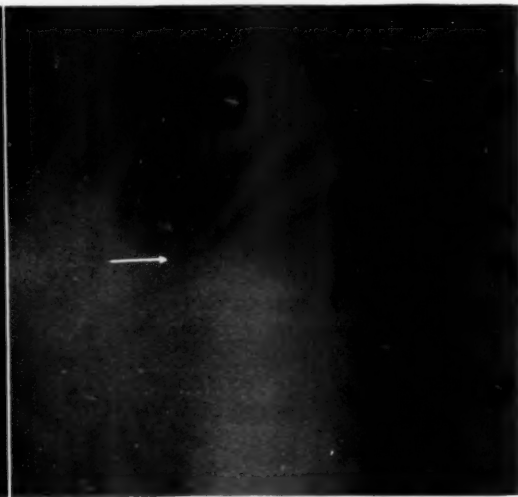


Fig. 6. Case 1. X-ray after reduction. Note restoration of anterior border of eleventh thoracic vertebra.

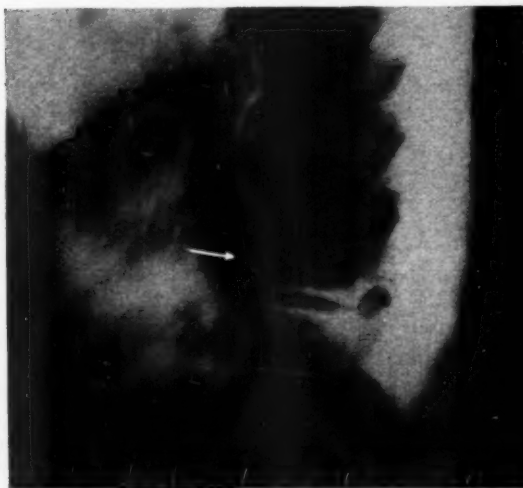


Fig. 7. Case 1. X-ray nine months after Figure 5. Bony restoration of trabeculae.



Fig. 8. Case 2. X-ray before reduction. Compression twelfth thoracic vertebra.

sistant, care being taken to keep the spine in the hyperextended position during this maneuver. The jerking thus obtained presumably dislodges the impacted fragments and allows the vertebra

patient to be anesthetized, and the manipulation is carried out over a period of several days, using a frame similar to a Bradford frame. The difference in this particular frame is that the lateral

bars are made of flat spring steel rather than round tubes. The lateral bars being made of spring steel will thus bend into a convex or a concave position, but will not bend toward each other. The patient is placed upon the frame and the frame is then made convex gradually

manipulation can be carried out under spinal anesthesia and can be done on an ordinary Hawley table with minimal assistance.

METHOD

The patient is given a preliminary hypodermic

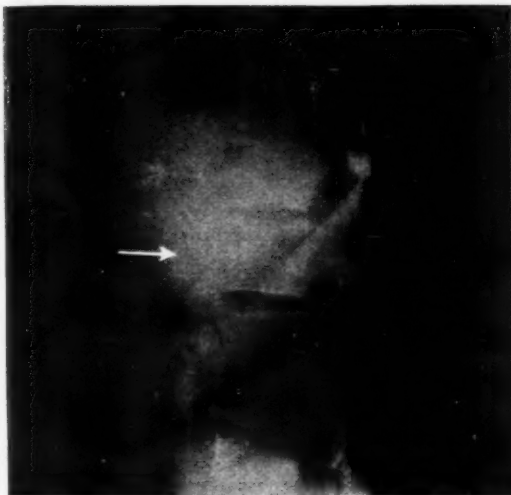


Fig. 9. Case 2 after reduction.

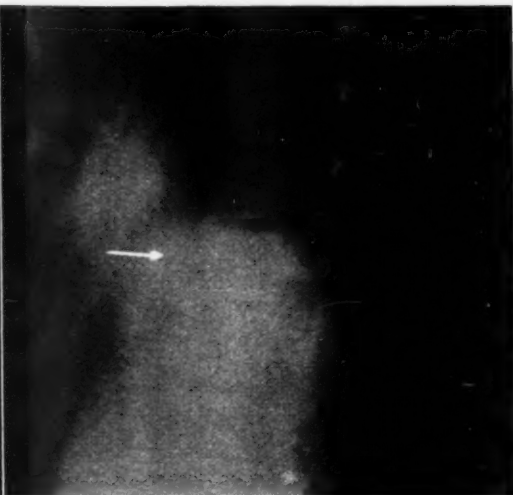


Fig. 10. Case 2. X-ray five months after reduction.



Fig. 11. Case 3. X-ray before reduction showing compression of first lumbar vertebra.



Fig. 12. Case 3 after reduction. Note correction of kyphosis as seen in Figure 11.

over a period of several days until the required amount of hyperextension is obtained. The patient remains on this frame for several weeks. The contribution which I am offering is that

of sodium luminal, and then 100 to 150 milligrams of novocain dissolved in spinal fluid are injected intraspinally, and the patient placed upon an ordinary Hawley table (Fig. 1). The spinal

anesthetic gives perfect relaxation and eliminates all pain. The feet are then fastened to the foot supports to obtain countertraction. The spine is protected by heavy pads of felt, then a heavy muslin bandage is fastened around the body directly over the injured vertebra, and the operator and his assistant lift this portion of the spine, thus creating hyperextension, and fasten the muslin to the horizontal bars directly above the patient (Figs. 2 and 3). With the patient in this position the operator then can create more extension and more gentle manipulation by locking his arms under the spine and under the arms of the patient. Gentle rocking of the spine from side to side and putting direct pressure over the injured vertebra aid materially. These can be done with absolutely no pain to the patient, and can be done very leisurely and with minimal effort. A plaster cast is then applied with the patient in the hyperextended position, care being taken to have the cast high on the chest and low on the pelvis, so that there may be three fixed points of leverage: high on the chest, low on the pelvis anteriorly, and directly over the injured vertebra posteriorly (Fig. 4). After the plaster cast is sufficiently dry and hard a large window may be cut over the upper abdomen to facilitate breathing. The patient is transferred from the Hawley table to bed, where he remains for approximately two months. During this time he may turn freely upon his side or upon his abdomen, but is not allowed to sit or stand. He is not even allowed into the semi-recumbent position until the two months are nearly up. Following the two months' period in bed a well fitting steel brace is made which keeps the spine in hyperextension and he is then gradually allowed onto his feet. The brace is worn for approximately six to nine months, during the latter portion of which period he is allowed to do practically all of his normal labor.

A precaution to be exercised should be noted: very careful scrutiny of the X-ray to discover or rule out a fracture of the lamina or lateral mass. If this were present and unrecognized serious damage to the cord might result. With great care, however, maintaining very strong traction, even a fracture dislocation can be corrected, as witness Davis' Case 7. Even more care must be exercised in those cases already exhibiting cord involvement, and only the thoroughly trained should attempt manipulation of these.

SUMMARY

1. A plea is made for earlier diagnosis of fractures of the vertebrae.
2. It is pointed out that compression fractures of the spine may be corrected so that the body of the vertebra can be returned almost to normal shape.
3. Holding the vertebra in this new position allows regeneration of bone so that there is no permanent disability.
4. The method consists of hyperextension.
5. Spinal anesthesia offers an excellent anesthetic.
6. The manipulation on the Hawley table offers an easy method of carrying out the manipulation.
7. Care should be taken to look carefully for fracture of lamina or lateral mass to avoid injury to the cord.

CASE REPORTS

Case 1.—H. U. M., 45 years of age, married, a banker by occupation, was in an auto accident March 23, 1930, in which his car went into a ditch. He felt a sharp pain in the back and was brought to St. Luke's hospital about 8 p. m. complaining of pain in the lower thoracic region.

Examination revealed no paralysis of the legs or arms and no disturbance of sensation. X-ray revealed a compression of the 11th thoracic vertebra (Fig. 5). He was placed on a fracture bed and given 10 gr. of veronal.

The next morning after a preliminary hypo of morphine (gr. $\frac{1}{4}$), a spinal anesthesia (using 150 mg. of novocain) was given, and the patient placed on a Hawley table. Hyperextension was accomplished by the method described above and a plaster-of-Paris cast applied (Fig. 6).

The patient remained in bed in the hospital three or four days and was then transferred by ambulance to his home. Considerable abdominal distress from distention lasted for about seven or eight days. He remained in bed at home for two months and then was allowed to get up gradually after a well fitting brace had been applied. The brace was worn seven months. X-ray examination in December showed bony replacement of the crushed trabeculae (Fig. 7). No pain was experienced on motion. The patient was able to do his former work.

Case 2.—A. O., aged 31, married, a female, was injured in an auto accident June 20, 1930.

X-ray showed compression of the 12th thoracic vertebra (Fig. 8). No paralysis nor sensory disturbance resulted. The fracture was reduced June 21, 1930, under spinal anesthesia (150 mg. novocain). X-ray showed

a good reduction (Fig. 9). Considerable abdominal discomfort lasted for five days. The patient remained in the hospital nearly three months. After two months the cast was replaced by a brace. X-ray in November showed good healing (Fig. 10).

Case 3.—T. J. H., aged 45, married, female, was pushed into a sitting position by an auto backing into her. She experienced a sharp pain in the back.

X-ray showed a compression of the first lumbar vertebra. No nerve injury was found (Fig. 11).

The patient was first seen on November 24, when the fracture was reduced and a cast applied under spinal anesthesia. There was moderate abdominal discomfort

four days. Subsequent X-ray showed good correction (Fig. 12).

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RACIAL DIFFERENCES IN BLOOD PRESSURE*

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REPORTS over a period of several years have suggested differences in the blood pressure levels of certain races. Musgrave and Sisson¹ in 1910 found the mean systolic blood pressure of thirty adult male Filipinos to be 108 mm. of mercury. Chamberlain² in the following year examined 156 Filipinos between 15 and 25 years of age and found that they had an average systolic pressure of 114.7 mm. From this he concluded that the blood pressures of the Filipinos are practically identical with pressures of the whites. On the other hand, Concepcion and Bulatao³ in 1916 studied the blood pressures of 362 male Filipino students and convicts between the ages of 15 and 30 years, and reported for the group, as a whole, a mean systolic pressure of 111.5 mm. and a mean diastolic pressure of 76.9 mm.

The Chinese also have been said by practically every writer to have blood pressures distinctly lower than the usually accepted standards for members of the white race. Tung⁴ summarized some of the more representative reports of blood pressure studies on the Chinese in the table here reproduced.

pressure of 82 mm. His figures for older age groups were much lower, 200 cases between 50 and 60 years of age showing a mean systolic pressure of 108.1 mm. and a mean diastolic pressure of 71.8 mm. These lower mean pressures of the older group raise the question as to whether excitement may not have been an important factor in raising the pressures of the younger groups.

PRESENT STUDY

In order to further investigate the racial differences in blood pressure, the pressure of American born and foreign born male students attending the University of Minnesota have been analyzed. For the purposes of this analysis only students between 19 and 29 years of age have been included. All blood pressure readings were taken in the same manner and under similar conditions, but undetermined differences exist in the length of time which these students had been away from their native lands. For purposes of comparison, the pressures of a group of Chipewewa Indians[†] of the same age and sex are included.

TABLE I
BLOOD PRESSURES OF THE CHINESE

Author	Part of China	Number of Subjects	Ages	Mean Blood Pressure	
				Systolic	Diastolic
Kao (Nat. M.J. China) 8:101, 1922	Central China	63	21-25	116 mm.	71 mm.
Cadbury (China M.J.) 37:823, 1923	South China	700	15-30	101 mm.	65 mm.
Kilbourn (China M.J.) 40:1, 1926	West China	741	14-31	111 mm.	70 mm.
Ying (China M.J.) 40:641, 1926	East China	182	21-50	113 mm.	72 mm.

The mean systolic and diastolic pressures of the 1686 Chinese subjects included in these studies are 107.3 mm. and 68.2 mm. respectively.

Donisson⁵ states that the blood pressures of the natives of Africa are practically the same as the pressures of whites in the temperate zone. His basis for this statement is the fact that in a group of 200 natives between 20 and 30 years of age in the interior of Africa he obtained a mean systolic pressure of 124.67 mm., and a mean diastolic

RESULTS

In Table II both median and mean pressures are shown, with the median listed first as the pressure most characteristic of the group. Age, height, weight, and percentage of standard weight, according to age and height, are included in the table because of the relationship which these factors frequently bear to the blood pressure.

*From the Students' Health Service, University of Minnesota.

†The blood pressures of the Indians were supplied by the Minnesota State Board of Health.

The median systolic pressures of students from the Philippine Islands, China, and Japan are the lowest of the groups studied. The pressures of the American Negroes are approximately the same as the pressures of the yellow races, the median being slightly higher but the mean slightly lower than for the Chinese, Japanese and Filipinos. Within the white race, several groups have been set up. Of these, the Eastern European Jews show a median pressure of 120 mm.; native born Americans, 120 mm.; and the Scandinavians, 122 mm. Highest of all were the American Indians with a median pressure of 128 mm. and a mean of 124.9 mm. To the Indians, of course, physical examinations were less of a routine procedure than to the University students; hence, it is very possible that greater excitement may have contributed materially to the high pressures exhibited by them.

The relations between the diastolic pressures of the several groups were similar to the relations between their systolic pressures, except for the Filipinos, whose systolic pressures were low but diastolic pressures relatively high. No explanation for this is apparent but the observation is in accord with the findings of others.⁶

The ages of the groups included in the study were sufficiently uniform to render age an unimportant factor as a cause for the differences in blood pressure. The differences in weight, and in the weight-height-age relationship of the several groups correspond in some instances to the differences in blood pressure; in others, however, this parallelism does not hold true. For example, the negroes have next to the lowest blood pressure with the highest weight-height-age percentage. This would make it appear likely that some factor other than size is responsible for the differences observed in the blood pressure.

COMMENT

These findings naturally raise the question as to whether there are true racial differences in blood pressure, or whether the differences observed are due to such conditions as climate, diet, habits of life, etc. Musgrave and Sisson¹ report that American soldiers in the Philippine Islands show a decrease of about 10 per cent. in systolic blood pressure over a period of several years. Foster⁷ and Tung⁴ report a similar drop in the blood pressure of Americans who have taken up their residence in China. On the other hand,

TABLE II
BLOOD PRESSURE OF STUDENTS FROM VARIOUS COUNTRIES

Native Country	Number of Cases	Mean Age in Years	Systolic Pressure Median mm.	Systolic Pressure Mean mm.	Diastolic Pressure Median mm.	Diastolic Pressure Mean mm.	Mean Height in Inches	Mean Weight in Pounds	% of Standard Weight
Philippine Islands	36	22.3±.4	112	116.5±1.5	78	77.4±1.2	63.7±0.3	114.7±1.3	90.8±0.7
China, Japan, Korea	28	22.3±.3	114	113.9±1.3	70	71.4±1.1	66.0±0.3	121.3±1.4	87.0±0.9
American Negroes	25	20.0±.4	115	114.0±1.2	72	73.2±1.0	66.9±0.3	137.0±2.8	102.4±1.8
Eastern European Jews	41	19.6±.3	120	119.4±1.1	73	72.7±0.9	65.8±0.3	131.7±1.5	100.1±1.0
American Students (White) (both parents born in U. S.)	542	20.3±.2	120	122.0±0.4	75	76.0±0.3	68.7±0.2	142.4±0.5	101.6±0.3
Scandinavian Countries	30	22.8±.4	122	122.5±1.2	78	76.8±0.8	68.7±0.4	147.3±1.7	97.8±1.0
American Indians	34	19.8±.7	128	124.9±1.2	80	76.6±1.1			

The standards used for weight according to age and height were those developed by the Medico-Actuarial Society of America.

Harris, quoted by Foster,⁷ manager of the North China Division of the Sun Life Insurance Company, Shanghai, states that "in our experience the blood pressure of the Chinese is considerably lower than the blood pressure of the Caucasian races. The blood pressure of the white races, that is, the Europeans and Americans in China, is, however, in our experience, just the same as the blood pressure in such races in Europe and America. We are also of the opinion that hypertension in foreigners is just as common in China as in western countries and that hypertension is rare in the Chinese." Roddis and Cooper⁸ found that the blood pressures of 173 American naval officers in the tropics were about 11.5 mm. below the level considered normal in the temperate zone; and Mukherjee⁹ states that the basal metabolic rate of Europeans in the tropics is below European standards.

These decreases of metabolism and blood pressure in the tropics are believed by Roddis and Cooper to be due primarily to alterations in physical activities. Alvarez's¹⁰ observation that the most typical systolic blood pressure of prisoners in a state penitentiary was 115 mm. of mercury and that the pressure did not exhibit the expected increase with age tends to support this theory. On the other hand, the observations here presented strongly suggests that when individuals of different races are living under the same or similar conditions there still exists a basic difference in the blood pressure level. It is entirely possible, of course, that the lower blood pressures of certain races may be the result of long continued differences in habits, customs, and modes of living.

SUMMARY

1. Differences exist in the mean and median blood pressure of certain racial groups of students at the University of Minnesota.

2. The Filipinos, Chinese, and Japanese exhibit the lowest median systolic pressures; the pressures of negroes were slightly, though not significantly, higher; while the Americans and the Scandinavians had the highest pressures of any of the student groups.

3. The relation of the diastolic pressures of the various groups is similar to the relation of the systolic pressures, except that the Filipinos with a low systolic pressure have a relatively high diastolic pressure.

4. A group of Chippewa Indians of the same age and sex as the University students, but examined under somewhat different conditions, had higher systolic pressures than any of the student groups.

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SOME OF THE PRESENT METHODS USED IN THE DIAGNOSIS AND TREATMENT OF PROSTATIC HYPERTROPHY*

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MOST urologists and many surgeons recognize the necessity of preoperative treatment of the patient who requires prostatectomy, and are aware of the lower mortality since this treatment has been used. In a paper,² read before this society in 1927, we stressed the importance of careful preoperative treatment, and emphasized some phases of this technic.

We have never been satisfied with the mortality occurring during the preoperative stage of prostatectomy. When we add this to the present operative mortality, we find the total is not as low as it should be. We have apparently transferred much of our operative mortality of twenty years ago to a present-day preoperative mortality. Is there anything more that we, as urologists, may do to lower the morbidity and mortality of the patient with hypertrophy of the prostate, whether preoperative or operative?

Our discussion here will dwell upon our experience with additional phases of preoperative and operative technic that in our opinion have a direct relationship to morbidity and mortality.

The Necessity of a Careful Physical Survey Before Preoperative Treatment is Begun.—We have found a careful physical survey of the patient of great importance before any preoperative treatment is started. This has become a rule because from experience we know that in many instances our preoperative treatment would either not have been started, or would have been changed, had we known the findings of a complete physical examination. Excepting in emergencies, a patient with hypertrophy of the prostate should not have more of a urologic examination than the finger palpation of the rectum, urinalysis and X-ray before the results of a complete physical survey, together with blood chemistry and electrocardiogram, are known. Our internists know the difficulties that the sufferer with prostatic disease may have during his preoperative and operative treatment, and of the im-

portance of discovering lesions before preoperative treatment is begun. Having this coöperation, we do not begin preoperative treatment until the physician assures us that the patient has no condition that may give rise to complications or contribute to morbidity or mortality. The internists are thorough in their search for foci of infection. They have taught us that a patient with any cardio-vascular lesion should have more careful and possibly more prolonged preoperative treatment than a patient with normal findings.

One of our internists warned us some six months ago concerning one of our patients who had some râles in the base of one chest cavity. We were told that this man might develop pneumonia following the slightest exposure to infection, and suprapubic drainage was suggested for a few months, during which time the lung condition might be treated. This advice was accepted, and three weeks ago we were able to remove this man's prostate, which was followed by an uneventful recovery.

The Role of Infection in the Preoperative and Operative Phases of Prostatic Surgery.—Infection in the epididymis still remains a troublesome complication during the preoperative and postoperative stages of prostate disease. A double vasotomy done before catheters or other instruments are passed through the urethra reduces this painful and distressing complication to a minimum. In a paper read at the last session of the American Urological Association,³ we emphasized the role of infection in the production of mortality in patients suffering from prostatic hypertrophy with the following summary:

I. Any type of catheter drainage of the bladder may introduce infection into the urinary tract, and, by traumatizing the urethra, introduce infection into the blood stream, both of which conditions become a factor in producing mortality.

II. In 93 per cent of the autopsy records studied, old or recent urinary infection was a major factor in the production of death.

III. Cardiovascular disease without urinary

*From the Department of Urology and Dermatology, The Nicollet Clinic, Minneapolis, Minnesota. Read before the seventh annual meeting of the North Central Branch of the American Urological Association, Indianapolis, Indiana, October 23-25, 1930.

infection was a factor in producing death in only 7 per cent of the cases.

IV. Bronchopneumonia was the cause of death in 46 per cent of the cases reported. In only two cases in this group did the autopsy findings fail to reveal evidence of a severe genito-urinary infection.

V. Forty per cent of the total number of deaths occurred during the preoperative treatment.

VI. The average number of days of preoperative urethral catheter drainage was nineteen. No conclusion could be drawn from our study of the duration of a catheter drainage.

From experience we know that infection may reach the blood stream when a catheter or other instruments pass through the urethra. This additional hematogenous infection when carried to partially damaged kidneys has been sufficient to interfere with their function so that a fatal uremia has developed. For this reason we recognize the importance of the more careful handling of the over-distended bladder. In the treatment of this condition we believe that the methods used by many of us are not satisfactory. Many urologists are in the habit of using the indwelling permanent urethral catheter with gradual decompression to relieve chronically over-distended bladders. It seems to us that with this and other methods now being used little attention has been given to the proper control of infection.

Our study of postmortem material indicates that urinary infection is a primary cause of death much more often than embarrassment of kidney function, which follows as the result of pressure from an overdistended bladder, ureters and kidney pelves. However, both of these factors may operate to produce morbidity and mortality. Infection introduced into the blood stream is frequently carried to the kidneys. Here the infection finds the defense mechanism low because of interference from residual urine in the bladder, ureters and kidney pelves, so that inflammation with the production of chills and fever begins.

If preoperative treatment consisted in merely removing the residual urine so that back pressure on the upper urinary might be relieved, our problem would be solved and our preoperative mortality would be nil.

Over-distention lowers the resistance of the urinary tract, but we doubt that this condition

alone may exist long enough to completely destroy the kidneys without infection. However, infection is more liable to occur with over-distention than without it.

We have been able to reduce our morbidity, and probably our mortality rate, by not attempting gradual decompression of the chronically over-distended bladder with the introduction of catheters through the urethra.

When we find a patient who has prostatic symptoms and palpable enlargement of the prostate, together with normal blood chemistry findings and slight residual urine with only a moderate infection in otherwise normal urine, we believe that repeated catheterization, and eventually a permanent catheter, may be used. In other words, we find some patients whose general condition is such that we believe their kidneys can withstand the amount of infection which may be introduced by the use of urethral catheters, either temporarily introduced, or for permanent drainage. We find it difficult, however, to judge the border line case that may withstand catheterization or may require suprapubic drainage. When in doubt, careful suprapubic drainage without contamination of the prevesical space should be done.

Examination of Urological Tract.—The urologist should make as complete a study of the urological tract as conditions permit. One cannot always be sure that the prostate is enlarged enough to produce symptoms by palpation per rectum alone. It may contain median and bilateral lobes which project into the bladder and are not palpable per rectum. In some instances it becomes necessary to differentiate between a prostate that is temporarily enlarged because of non-specific prostatitis, and an adenoma, or both. Occasionally we have found it necessary to use the cystoscope before this differentiation could be made. This instrument should not be used, however, until infection has been controlled, and not until drainage of the kidneys and bladder has been completed.

The cystogram will frequently give useful information concerning the size of the prostate and the bladder, and the presence or absence of diverticuli.

We find that many urologists do not watch the pus content of the urine carefully enough. Some method of calculating the number of pus cells per high power field should be used, so that we may

know whether infection is increasing or decreasing. The constant occurrence of many pus cells in the urine after adequate drainage of the bladder has been established should direct suspicion toward the upper urinary tract. In a few instances we discovered pyonephrosis and pyoureter which required attention before prostatectomy could be undertaken. It is our opinion that the cystoscope, ureteral catheter and X-ray should be used with the prostatic patient just as they would be used in the diagnosis of any other urological lesion. Before the routine use of X-ray in examinations, large bilateral renal stones have been found which were present before and after prostatectomy.

When cystoscopy is contraindicated or impossible, the use of intravenous urography may give helpful information concerning the upper urinary tract.

To sum up, then, we believe that the preoperative treatment of patients suffering with hypertrophy of the prostate should aim at control of infection and the discovery of lesions in the urinary tract or in other organs which from an internist's point of view might be a factor in increasing morbidity or mortality. From our experience we believe that care in the evaluation of these two factors will materially reduce morbidity and mortality, particularly in the large group of patients who die before prostatectomy is undertaken.

Surgery of the Prostate.—After preoperative treatment has restored the patient's functions to normal, prostatectomy may be undertaken. Careful operative technic will eliminate hemorrhage as a postoperative complication. When the one-step so-called open operation (primary suprapubic prostatectomy) can be done, the control of hemorrhage is not difficult. In order that bleeding may not interfere with our careful enucleation of the prostate, we have been in the habit for the last fifteen years of injecting the prostate and prostatic capsule through a long needle with novocain or salt solution. This method has recently been described by Ballenger,¹ and we like to follow his technic. This controls bleeding so that we are able to see what we are doing at all times, and we have little difficulty in picking up bleeders and tying them when the enucleation is completed.

Careful trimming of the ragged bladder edge and subsequent sewing with interrupted stitches

have been great factors in the control of postoperative hemorrhage. In addition to these safeguards, we are in the habit of using a rubber bag partially filled with water in the prostate bed. With this technic we have not had a postoperative hemorrhage during the last four years. We like to sew the bladder to the abdominal wall and attempt to repair the incision of the bladder, so that we have a water-tight opening around the drainage tube. As soon as the patient returns to bed following prostatectomy, antiseptic solutions are introduced into the bladder, which continue our fight against infection. This is continued even after the suprapubic wound is healed. Following the removal of the bag, we do not introduce a catheter through the urethra at once, because we still fear the possibility of carrying infection into the recently operated field. The suprapubic drainage tube is replaced every two or three days with a smaller one, and after the tenth or twelfth day a small catheter may be introduced through the urethra and all suprapubic drainage removed.

Nursing.—The proper care of patients with hypertrophy of the prostate requires the services of a male nurse who has been thoroughly trained and who has nothing else to do. We are sure this type of expert care reduces the patient's stay in the hospital at least a week, and reduces the time that he drains suprapubically from seven to ten days.

Anesthesia.—After trying several general anesthetics, we have come to rely on spinal as the anesthesia of choice for prostatectomy or cystotomy. Our second choice is hyoscin and morphine, plus infiltration both of the suprapubic area and of the prostate.

SUMMARY

1. Preoperative examination of patients suffering with hypertrophy of the prostate is of tremendous importance, and therefore must be very thorough, and every finding properly evaluated before the plan of preoperative and operative treatment is determined.
2. In the preoperative treatment of the prostatic patient the urologist's aim should be to control and relieve infection in the urinary tract.
3. Infection present in the urinary tract, together with that introduced by instrumentation, causes a bacteremia which is responsible for the majority of deaths occurring during the treatment of these patients.

4. The fight against urinary infection should be continued during postoperative convalescence and until the patient is returned to normal health.

5. The type of anesthetic to be used should be chosen to fit the patient. Our experience teaches us that spinal or hyoscin and morphine hypnosis, plus infiltration, are the best methods.

6. The technic of surgical removal of the prostate should be directed to the control of hemorrhage. We believe that this may be best accomplished by a technic that permits the surgeon to view the field.

7. The services of a specially trained male

nurse are invaluable in the care of the prostate patient.

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CASE REPORTS

TRAUMATIC APPENDICITIS*

REPORT OF CASE

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Not long ago I was present at an autopsy which was performed on the body of a young man who received an injury to his abdomen and who had subsequently developed appendicitis, peritonitis and died. The history was that this man had apparently been well until September 30, 1929, when, while cranking an auto truck, the engine back fired and the handle of the crank struck him in the abdomen so that he complained of pain to a fellow workman who was with him at the time. They eventually got the motor started, and he drove the truck a number of blocks and left it at his destination. He went home and complained to his wife that he had pain in the abdomen. He sat down to dinner, ate very little and, although there was company at his house for dinner, he went to bed very soon after the meal, stating that he did not feel well. He vomited early in the evening and slept very little during the night. The next day his pain became more severe but gradually subsided. A physician was called who obtained the history as just outlined, examined the patient and stated that in his opinion the man was very likely suffering from appendicitis but that he probably was over the worst part of the attack and that he probably would recover without operation.

On October 4, four days after the blow on the abdomen, the same physician was again called and found that the symptoms were much worse. He had the man sent to the hospital and operated on him the same evening, and found a gangrenous appendix incompletely walled off and a small amount of pus. The appendix was removed and drains were inserted. On entrance to the hospital his temperature was 100.8, pulse 108. From the fourth postoperative day on there was an increase in the temperature and pulse rate, he was irrational at times and he died on October 13, 1929, fourteen days after the accident and nine days after his operation. He was buried. Later the question arose of the relationship of the blow on the abdomen to the development of his appendicitis and death, and an autopsy was performed on November 23, 1929, about six weeks after his death. Definite evidence of peritonitis was found. There was no dispute about the fact that he had appendicitis and peritonitis. Apparently there was no question about the fact that he received a blow on the abdomen which caused him to complain, nor that he

was feeling well up to the time he received the blow and that symptoms began soon after.

I have asked a number of men of considerable medical and surgical experience their opinions about traumatic appendicitis and whether they had seen such cases. The usual reply has been that the appendix was such a mobile and well protected viscus that it is very rarely traumatized unless some extreme force or crushing blow does such extensive damage to the abdominal wall and trunk that the appendix is included with other tissues damaged by the force. On looking up the literature I found that traumatic appendicitis is by no means such a rare condition and many cases are cited where an apparently healthy individual receives a blow on the abdomen and promptly develops appendicitis.

It is true that the appendix is a deeply situated and mobile organ and that this location and mobility are protecting factors against direct trauma. It appears, however, that traumatic appendicitis results from a blow on the abdomen which involves certain other factors.

The lumen of the appendix is continuous with that of the cecum and the contents of the bowel enter the appendix freely, remain there for a time and then are expelled into the cecum. The cecal and appendiceal contents are at all times laden with bacteria capable of invading the appendiceal wall under favorable conditions. We know from observing patients who have been given a barium meal or enema under the fluoroscope that with relatively slight pressure material can be forced from the cecum into the appendix. It may remain for a few moments, hours or for several days.

Experimenters (Furbinger and Von Hanseemann) were able to express the contents of a full cecum into the appendix by light manual pressure over the cecum, by light manual pressure over the ascending colon and by introduction of air into the rectum. They used colored fluids as an indicator.

Let us now consider what may happen if a blow is received on the abdomen sufficient to cause a violent contraction of the muscles and increase the intra-abdominal pressure. Several things may happen as far as the appendix is concerned.

1. The bowel content may be forced into the appendix sufficiently to produce a moderate distention of the appendix but the elasticity of the appendiceal wall forces the bowel material back into the cecum, when the pressure decreases and no untoward effect is noted.
2. The force may be sufficient to distend the appendix beyond its physiological limit, producing minute cracks or tears in the lining of the appendix and these allow the bacteria which are always present in the lumen to invade the wall of the appendix and produce disease.

3. The force may be sufficiently strong to produce

*Read before the Minneapolis Surgical Society at its meeting of March 5, 1931.

not only cracks in the mucous membrane or muscle coats but it may actually cause a rupture through the wall of the appendix allowing immediate spilling of the bowel content into the peritoneal cavity.

4. Let us now consider what may happen in an appendix in which a fecalith is present which is too large to be expelled through the ileocecal valve. The bowel content is forced into the appendix and the muscle of the appendiceal wall attempts to force the fecal material back into the cecum but the opening becomes obstructed by the fecalith. If the material is now confined within the appendix under pressure, a stasis results. These conditions favor the growth of bacteria. Pressure is developed further, the resistance of the mucous membrane is damaged more and invasion of the wall is greatly favored. If the appendix has been the seat of previous attacks of inflammation which have caused kinking of the appendix and the formation of adhesions, these factors will make it even more difficult for the appendix to be emptied. As the pressure in the lumen of the appendix increases, distension follows. The circulation in the wall of the appendix is progressively impaired. Perforation is very apt to occur.

Another factor of importance is that a fecalith or coprolith is evidence of a pre-existing inflammation in the appendix. It is formed in that stage of the inflammation when the secretions are increased and it is made up of fecal material mixed with bacteria and inspissated mucus. Later this material becomes drier and hardens by chemical change and absorption. The mucosal crypts may be flattened out by contact with it. Aschoff³ states that the primary or most active focus of infection is just distal to the coprolith.

As Ludington gives them: The conditions favorable for the development of a traumatic appendicitis are: (a) having the lumen obstructed by a coprolith; (b) fecal stasis in and defective drainage of the distal segment; and (c) an increase in the virulence of the contained organisms due to their confinement. When these conditions are present, if an excess of fecal contents is forced into the appendix it must either push the coprolith farther into the appendix or flow over and around the obstruction, filling and distending the terminal segment. Quoting from Ludington: "The immediate result of the afflux of cecal contents is pain from the distension of the appendix and from its efforts to empty itself. The distended appendiceal wall is rendered anemic by pressure, particularly in its mucosal layer. The virulence of the organisms is heightened by the establishment through the fecal stasis of conditions favorable to their development. These factors eventuate in an immediate and destructive invasion of the appendix wall."

The danger of active purgatives in appendicitis is recognized and Berkley Moynihan's alliterative sequence of pain, aperient, perforation represents the same mechanism as that obtained in a traumatic case, but substitutes as the propelling force the hypermobility of the stimulated intestine in the place of direct external pressure.

It will be seen, therefore, that the mere fact that a blow applied to the abdomen does not cause traumatic

appendicitis by actual bruising of the appendix itself but causes it by overdistention of the appendix by increasing the pressure within the cecum, forcing the material into the appendix. It is apparent and readily admitted that this forcing of the cecal content into the appendix occurs a great many times and no appendiceal disease follows, but when conditions are right a blow on the abdomen can and does instigate an attack of appendicitis. The fact that trauma can and does play an important rôle in the production of appendicitis should be appreciated by medical men. Indeed careful reading of the literature shows that it is appreciated and recognized.

Howard A. Kelly wrote a book on "The Vermiform Appendix," published in 1905, and devotes considerable space to traumatic appendicitis and gives an outline of the history of fifty cases. These cases included individuals from two to forty-nine years of age. As one would expect, males were much more frequently affected than females, forty-one being males, and eight females. The sex was not mentioned in one case. It is interesting to note that in his fifty cases there was no evidence of external violence to the abdomen such as contusion or laceration in any instance. There was evidence of previous morbid condition in the appendix in thirty of his fifty cases.

Osler⁷ states that persons whose work necessitates the lifting of heavy weights seem more prone to the disease and that trauma plays a very definite rôle and that in a number of cases symptoms have followed very closely a fall or a blow.

John B. Murphy⁸ states that as early as 1892 he had called attention to the fact that trauma was occasionally an exciting factor in appendicitis and recognized that if the lumen is obstructed by fecal concretions the circulation of the wall of the appendix could be interfered with.

Ludington's⁹ three cases were interesting. One was in a ten-year-old girl who fell from a swing, a distance of about two feet, and landed prone on level ground. Pain was immediate and severe. Vomiting followed and eighteen hours after the fall all the symptoms of peritonitis were obvious and operation thirty-six hours after the fall disclosed an appendix acutely angulated at its mid-point by a single firm adhesion. Immediately distal to the point of angulation an actively advancing peritonitis was present. His second case was that of a boy, nine years of age, who was enjoying the first sliding of the winter by "belly flopping" on a sled. He abandoned his sport on account of abdominal pain. Vomiting followed, and seventy-two hours afterwards a gangrenous appendix, containing a coprolith, was removed. His third case was that of a girl, nineteen, who thought she might have had appendicitis on account of pain in the right lower quadrant which recurred at intervals. She was examined carefully, her abdominal wall was thin, and deep palpation in the right lower quadrant failed to reveal evidence leading to a diagnosis of appendicitis. She was advised to go home and take a laxative, which she did, but on leaving the office she stated that the examination caused aching in the right lower quadrant. The ache grew worse and at 5 a. m.,

sixteen hours after the examination, the appendix perforated and at operation, later, a perforated appendix which contained a coprolith was found.

Addison H. Bissell² reports four cases. The first case was in a fourteen-year-old boy who had not had a previous attack of appendicitis. While playing football he fell forward striking his abdomen on a rock. He felt severe abdominal pain immediately and vomited. The abdominal pain was severe at first but lessened somewhat after an hour. It was, however, constantly present up to the time of the operation the day following the accident, at which time the wall of the cecum was injected and thickened. The right iliac fossa was the site of a large abscess and free in this abscess was a fecalith. The appendix was long, its distal half was necrotic and near the tip was a perforation, one inch long, opposite the attachment of the mesentery. The second case was in a ten-year-old boy without any previous history of appendicitis, who received a severe kick in the abdomen while playing football. He felt immediate abdominal pain, was nauseated and vomited. He felt pain in the upright position and was chilly. He was kept in bed at home for six days without being seen by a physician and he suffered constantly from severe abdominal pain and nausea, vomiting, chills, distension and constipation. On the sixth day he was sent to the hospital by a physician and operated upon immediately, and marked generalized fibrinopurulent peritonitis was present. Near the tip of the appendix was a perforation, one inch long, with markedly thickened everted edges. A large concretion was found in the part near the perforation, which was on the external lateral aspect of the appendix. Case 3 was that of a nineteen-year-old boy who had not had any previous attack of appendicitis. Forty hours before operation he had been thrown on his back while wrestling and his opponent had jumped on his abdomen. He felt immediate colicky abdominal pain, he was nauseated and vomited. At the operation the appendix was found to be four inches long, in normal position and not adherent. The entire appendix was markedly inflamed. The distal half was necrotic. There was a perforation, one inch long, near the tip of the anti-mesenteric side. A general peritonitis was present without the slightest evidence of any walling off. He did not show any improvement after his operation and died on the third day. Two concretions were found in the region of the appendix. Free purulent material filled the abdominal cavity.

Case 4. A boy, aged 18, who had not had any previous attacks of appendicitis, fell hard while skating, striking his buttocks. He felt pain immediately around the navel and in the right lower quadrant. He felt faint and chilly, was nauseated, and vomited. He was first seen by Dr. Bissell twenty-six hours after his fall and an appendectomy was immediately performed. A general peritonitis was present. A large abscessed cavity was observed in the right lower quadrant and a concretion was found in this cavity. The appendix was 2.5 inches long, its wall thickened and necrotic. Near the tip a perforation, one inch long, with everted edges was found.

Dr. Richard J. Behan¹ of Pittsburgh reported a case in a young man, twenty-eight years old, who fell over a tomato patch, landing on a sewer crock, inflicting a bruise on the left side of the abdomen. From this time on he had severe pain in the abdomen which was more or less constant. After the first severe onset the tendency was for the pain to be localized in the right side. Three weeks after this first injury he had a sudden exacerbation of pain in the abdomen with nausea, weakness and general malaise. Operation revealed a large abscess in the region of the appendix with the cecum firmly bound down to the lateral peritoneal wall and over 400 c.c. of dark foul liquid was removed from the peritoneal cavity, by means of the suction apparatus.

No attempt will be made in this article to collect all of the cases of traumatic appendicitis reported in the literature, but many cases are encountered where a blow on the abdomen is followed almost immediately by symptoms which we ordinarily recognize as those of appendicitis and subsequent operation has revealed a gangrenous appendix, and in a great many of these cases fecal concretions are obtained.

The relationship of trauma to the abdomen with a subsequent development of appendicitis is of importance not only in a general medical way but also from a medico-legal standpoint as well. Of course, it is a well known fact people are very prone establish a connection between any disability and an accident which may furnish a possible cause for it and this is especially true if the question of compensation or liability enters into it. It is a common thing to see patients who will ascribe the production of a tumor of the breast or abdomen to a bruise or fall and if the patient has pain in his extremities which might be due to a rheumatism or neuritis it is not unusual to have such a patient give as his opinion that the symptoms were present because some accident had happened to him at some time or other. This factor is well recognized. Nevertheless, we must also admit that there is such a clinical entity as traumatic appendicitis "and that such testimony to that effect must be given, when the facts warrant it, with assurance, whether it be for or against an individual or association."

"To argue as to whether the organ was normal or not is beside the point, for the abnormalities that make for easy invasion of the appendix by infection after injury are compatible with good health, and the question should be whether an abdominal injury, or unusual strain, precipitates the clinical picture of acute appendicitis. There does not need to be any doubt that this can take place. The trauma is the deciding factor." (Bissell.²)

Another important factor to be considered is that when the appendix has been removed and is examined in the laboratory it is impossible to state whether or not this appendix which might be gangrenous and perforated was a traumatic appendicitis. One's opinion in that regard is formed on the careful history which describes the circumstances immediately preceding the events and condition of the patient immediately preceding the trauma and accurate description and understanding of what occurred at the time that the trauma

was received, the time relationship between the trauma and the onset and development of symptoms and finally the findings at operation. All of these factors are taken into consideration in forming that opinion as to whether or not the case in question is one of traumatic appendicitis.

I do not claim to bring forth anything new or original in this discussion but my reason for bringing up the subject is to call attention to the fact again that there is such a thing as traumatic appendicitis and it is our duty to recognize it.

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CONGENITAL INTESTINAL OBSTRUCTION

REPORT OF CASE

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Symptoms of bowel obstruction, seen within the first few days of life, are, almost without exception, due to congenital maldevelopment of the gastrointestinal tract. It is true that intussusception in the new-born takes place, as shown by the reports of Gelston and Sappington (1) and Steele (2), but this is most unusual. Of the mal-developments, imperforate anus is four times as frequent as all other atresias, according to Davis and Poynter (3), and is very easily recognized and surgically cured. Anomalies of the intestines proper are less frequent and Miller (4) gives their occurrence as one in every 15,000 to 20,000 births. Anatomically the duodenum, the ileum, the jejunum, or colon, are the usual locations; of these the frequency is shown by the following tabulation of Davis and Poynter (3):

	Cases
Duodenum, above the papilla.....	59
Duodenum, below papilla.....	75
Jejunum	66
Ileum and cecum.....	101
Colon	39
Multiple atresia	67

Numerous causes have been given for these atresias. Tandler (5) and Forssner (6) maintain that failure of epithelial plugs to canalize is the cause and the former has demonstrated such a plug in the duodenum of fetuses of four to ten weeks. Vascular sclerosis or anomalies are believed by Davis and Poynter (3) to re-

sult in atrophy and fibrous replacement of developing intestine. Other theories include fibrosis following volvulus, intussusception, anomalous peritoneal bands, and the healed fetal peritonitis reported by Fielder (7).

Symptoms usually do not appear until the infant begins to take food, but excessive abdominal distension and the passage of pale or lanugo-free meconium may be present to suggest intestinal obstruction. Vomiting soon appears. Varying with the location of the obstruction, this begins a few hours after nursing in high obstruction or is delayed for hours in lower obstruction. Occlusion below the papilla results in bile-stained emesis. Blood also may be present. Vomiting is persistent and inanition rapidly ensues. Constipation and obstipation are important symptoms. Meconium may be found if the obstruction is above the opening of the bile duct, but usually true lanugo-containing meconium is not present. Abdominal distention is usually noticeable from birth. Urine is scant and dark colored. Loss of weight is rapid and by the third day the infant's condition is grave.

This pathologic condition may involve any part of the intestine and atresias are often multiple. Duodenal lesions are usually single, and most of them are below the papilla according to Grulee and Bonar.⁸ Obstruction may be due to a membrane only, the blind ends may be joined by a cord, or, more rarely, they may be completely separated. At the place of atresia, the proximal intestine terminates in a greatly distended blind sac, with hypertrophied walls.

The diagnosis of atresia of the intestine is usually easy from the symptoms and the demonstration of a blind gut by barium feeding and X-ray.

The treatment is essentially surgical. The prognosis is practically hopeless and reports of only six cases of successful operation for intestinal atresia were found. The first was in 1911 by Tockens,⁹ who performed a lateral anastomosis for atresia of the ileum on an infant eight days old. In 1916, Ernst¹⁰ performed a duodenojejunostomy for atresia of the distal half of the duodenum with survival of the patient. Richter¹¹ of Chicago mentions an infant having atresia at the duodenojejunal angle which he cured by posterior gastroenterostomy. In 1927, Sweet and Robertson¹² reported a patient treated by them on its ninth day of life for atresia of the first portion of the jejunum by gastrojejunostomy. The relief obtained was only partial. At the end of three weeks at a second operation, anastomosis between the dilated duodenum and jejunum was performed with full recovery. Bolling¹³ reports two patients having atresia of the duodenum who were well following gastrojejunostomy.

The case reported herewith concerns a male baby, the fourth child of healthy parents, born spontaneously one month prematurely, after but a few hours' labor. No external deformities were present; breathing, heart action, and crying were normal. The birth weight is reported as 5.75 pounds. Birth occurred at 12:15 o'clock p. m. on April 17, 1931, in the family farm home. About forty-eight hours after birth, the family reported that the infant vomited all its food at infrequent intervals. They were instructed to bring the child to the

hospital, where it weighed 5 pounds and 1.25 ounces, or 2,295 grams, upon admission at 6.45 p. m. on April 19, 1931, and measured 19 inches long. The skin was dry, slightly icteric and the child looked very sick. The temperature was normal. Urine was dark colored and scant. The bowels moved twice a day but only a small amount of slightly green mucus was expelled. Food was

cord, 2 to 3 mm. in diameter, for 4 cm.; at this point the patent intestine was again present and continued to be so to the anus. The accompanying illustration is a retouched tracing of the removed organs showing the atresic cord and the general anatomical relations. The mesentery of the atresic cord was practically avascular, giving weight to the opinion that the maldevelopment might be the result of vascular anomaly.

Conclusion.—Congenital atresia of the intestines is relatively infrequent and cases of surgical cure are very few. A case of fibrous atresia of the second portion of the jejunum with postmortem findings and illustrative drawing is reported. Vascular anomaly is a likely cause of the reported case.

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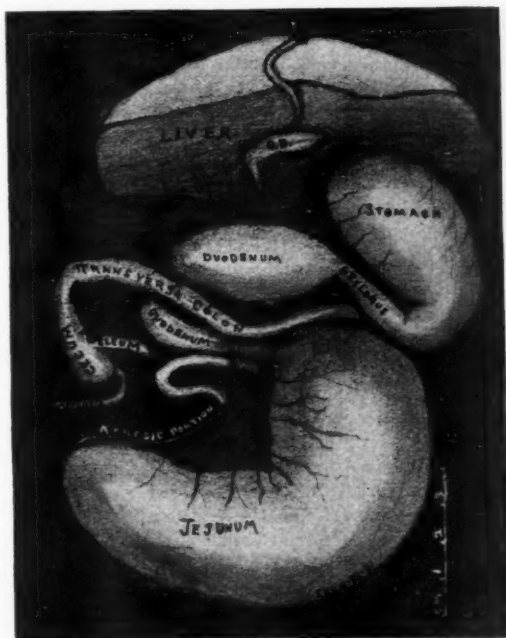


Fig. 1. Illustration is a retouched tracing of the viscera removed at postmortem examination. Atresia due to a 4 cm. fibrous cord of the jejunum with dilation of the intestine and stomach above the obstruction is shown.

taken greedily. The abdomen was distended and tympanitic. Vomiting occurred once about every sixteen to eighteen hours during the life of the infant. Feedings of a half ounce of breast milk were given seven or eight times a day.

X-ray examination revealed a stomach filled with an opaque meal which moved through a dilated duodenum into a very large blind pouch. Diagnosis of congenital obstructive lesion was made by Dr. W. L. Freeman, the roentgenologist.

The infant's condition was poor at all times; therefore surgery was not attempted. The child lived a little over five days, and at death it was deeply jaundiced and weighed 1,910 grams. Essential postmortem findings were a distended stomach and duodenum with a greatly dilated first half of the jejunum, which ended in a blind sac. From this it extended as a solid fibrous

TETANUS FOLLOWING INDUCED ABORTION.

REPORT OF CASE WITH RECOVERY

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TETANUS following induced abortion is a very rare condition. The mortality reported in the literature is very high. Schneider,* in a survey of the literature, found the mortality of 111 cases of puerperal tetanus to be 91 per cent. We, therefore, think it justifiable to report this case.

The patient, a woman, aged 33, white, entered Ancker hospital May 4, 1931, complaining of inability to open her jaw, difficulty in swallowing, and stiffness and pain in her neck. These symptoms, first noticed on May 1, three days before admission, had grown progressively worse until at the time of admission she was unable to take even liquids by mouth, and her upper dental plate could not be removed.

At this time the patient stated that on April 28, 1931, three days before the onset of symptoms, a very small splinter from a broom handle had become lodged in the little finger of her right hand. This broom had never been used outside of her kitchen, and because of the size of the splinter (it measured 3/16 of an inch in length) and the absence of reddening, exudation and any other signs of local reaction, a search was made

*Medizin, Klinik, Jan. 22, 1926.

for another primary focus of infection. None could be found, though a foul smelling, sanguinous vaginal discharge attracted attention. At the time of admission the patient absolutely denied any irregularity in her menstrual cycle. However, a few days later she volunteered the following additional history: Her last normal menstrual period had terminated on January 28, 1931. She admitted having sexual intercourse during the first part of February and had missed her February and March periods. On about April 15th, thinking she was pregnant, she went to a midwife, who introduced a rubber catheter into the uterus. This was removed in twenty-four hours, following which she had a few cramps and within a day or two passed a liver-like mass. There had been no chills or elevation of temperature, though the foul, sanguinous discharge noted on admission had been present since then.

This abortion was performed approximately two weeks before the onset of her first symptoms.

The patient also stated that during the month of March and the first week in April a pink rash had been present over the skin of her back, chest and abdomen. It disappeared spontaneously.

There was nothing else of interest in her past history except for tuberculosis in her mother, who is now a patient in the tuberculosis ward. The patient herself had had pleurisy several times in the past two years, and is now being observed for other evidences of tuberculosis, which as yet have not appeared.

Physical Examination.—On admission, the patient was an undernourished white female, with a temperature of 100°, a blood pressure of 112/60, and a rapid, regular, full pulse. She had a rather set expression to her face. Her jaw was held tense, almost completely closed, with the corners of the mouth drawn slightly back and upwards. Slight wrinkling of the forehead was present. Her upper dental plate could not be removed. There was moderate neck rigidity with pain in the upper spine on attempted flexion of the neck. Her biceps, triceps, patellar and achilles reflexes were all equal and markedly hyperactive. Ankle clonus was present bilaterally. Kernig's sign was positive. Babinski's sign was negative. The previously mentioned sliver was present, lodged in the epidermis of the fifth finger of her right hand. There was no evidence of infection or local reaction. The foul-smelling vaginal discharge was noted, but pelvic examination revealed nothing excepting slight enlargement of the uterus. There were no other positive physical findings.

Laboratory Findings.—The urine was negative. The blood was negative except for a 4 plus Wassermann reaction. The spinal fluid on first examination showed a 4 plus Wassermann. Pressure varied greatly from time to time, and after administration of antitoxin the globulin content increased to 3 plus at one time, and the cell count, also variable, rose as high as 1,800 per cu. mm. Colloidal gold determinations showed a slight rise in the last four tubes. Culture of the spinal fluid showed no growth.

Treatment.—Nutrition was maintained by nasal tube feedings of eggs, milk and sugar two or three times daily. The sedatives used were morphine in quarter

grain doses every four hours for the first few days, and chloral hydrate in doses of from 20 to 30 grs. with each nasal feeding. The specific treatment consisted of massive doses of tetanus antitoxin. Spinal drainage followed by intraspinal injection of 20,000 units of the antitoxin was done daily for ten days. Intravenous injection of 10,000 units was done daily for seven days, and a total of 14,000 units was given intramuscularly about every third day. Thus, a total of 272,000 units of antitoxin was administered over a ten-day period.

Progress.—During the first forty-eight hours in the hospital the patient ran a progressively down-hill course. Her jaws became completely locked, the sardonic grin more marked, and her lips and nails became definitely cyanotic. All the muscles of her body were involved in a generalized hypertonicity. Her spine assumed the position of opisthotonos, her neck became very rigid, and her arms and legs became almost completely paralyzed, manifesting a lead-pipe spasticity. Her fingers remained extended and spastic. There were frequent jerkings and twitchings of all the muscles, especially those of the spine, causing considerable pain. This symptom was fairly well controlled by morphine and chloral. The reflexes became more hyperactive, almost to the point of clonus. However, from the third to the seventh day after her admission, improvement was slow but progressive, and at the end of a week the general rigidity had greatly diminished. The patient was then able to open her jaw sufficiently to allow the removal of her upper dental plate, and was able to swallow a liquid diet fairly well. Jerking and twitching with pain in the spine were still present at times, but of lessened severity. The neck rigidity and opisthotonos had improved greatly. All these symptoms and signs gradually improved until on the 22nd of May, 18 days after admission, the patient was back to a practically normal condition, with the exception of weakness and a slight stiffness of her knees and elbows on extreme extension. There was no evidence of residual paralysis, and her jaw could be opened to a practically normal degree. There was nothing characteristic about the temperature, which varied from 100° to 104°, and persisted for twelve days.

Complications.—On the seventh and eighth days after admission the patient complained of abdominal cramps, which were relieved in both instances by atropin and enemata. On the ninth day after admission she complained of pain in her right lower chest, worse on deep inspiration. A definite friction rub was heard over this area, with diminished breath sounds. This cleared up in twenty-four hours with no special treatment. On the tenth and eleventh days after admission she developed a toxic psychosis, with very vivid delusions of persecution. She made a complete recovery from this psychosis within forty-eight hours. Convalescence was otherwise uneventful.

Discussion.—We believe the induced abortion was the etiological factor in this case, because, with the exception of the sliver, no other possible portal of entry could be discovered, either by physical examination or from the history. We feel that the short time interval

between this sliver injury and the onset of symptoms (three days) as well as the insignificance of the injury ruled it out, whereas the time interval between the abortion and the onset of symptoms (fourteen days) is a reasonable incubation period. Also, the evidences of infection in the uterus lent credence to this view.

We believe the chief point of interest in this case was the fact that cure was effected by massive doses of tetanus antitoxin alone, without the use of other advocated curative measures.

Ancker Hospital,
Saint Paul.

BISMUTHOIDOL NOT ACCEPTABLE FOR N.N.R.

The Council on Pharmacy and Chemistry reports that in 1926 Les Laboratoires Robin, Paris, France, requested acceptance of Bismuthoidol, which was stated to be colloidal bismuth in isotonic solution. The product is distributed in the United States by E. Fougere & Co., New York. The Council examined the submitted evidence and informed the proprietors that it was insufficient to establish the claims advanced for the product. In 1930 E. Fougere & Co. again requested consideration of Bismuthoidol. The Council examined the further evidence which was submitted and informed E. Fougere & Co. that Bismuthoidol is at present unacceptable for New and Non-official Remedies because the submitted advertising shows that, if accepted, its acceptance would be used to advertise unaccepted products and because the claims made for the product are unwarranted. The Council's report calls attention to the fact that, while the Council holds the intravenous adminis-

tration of bismuth preparations unsafe, Bismuthoidol is used intravenously. (Jour. A. M. A., June 20, 1931, p. 2104.)

USE OF SALINIZED WATER IN INDUSTRY

At the present time salines are regarded as preferable to dextrose in the prevention and treatment of factory cramps due to excessive loss of fluid and salines through sweating. Both prevention and treatment of cramps are well abetted by the intake of dilute saline solutions to compensate for loss through sweating. It is, however, undesirable that tablets of salts be taken into the body as such. It is better that the entire water supply be treated with salt to the extent of 1 per cent. A strength from 0.3 to 0.5 per cent, being more palatable, may lead to more extensive use, especially if kept at a temperature from 47 to 52 F. (Jour. A. M. A., June 13, 1931, p. 2055.)

PRESIDENT'S LETTER

I HAVE been wondering what impression Will Rogers' statement, that the American mother would be safer in India than she is here at home, has made on the American public.

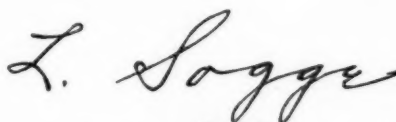
Such bombshells as this are thrown at us every once in a while. They may be facts and they may not. But a statement from Will Rogers is likely to be very extensively read and very extensively believed anyhow.

That being the case, I feel very strongly that the State Association, through the American Medical Association, should investigate the matter carefully. It occurs to me that there may be a question of reliability of statistics in this comparison with Mother India. But we ought to know, anyhow, whether we are dealing with facts or dramatic rumors. We ought to know whether it is a fact, as rumor has it, that 16,000 mothers die in America in child-birth every year, 10,000 of whom, at the very least could have been saved.

If it is indeed a fact, then a grave responsibility rests upon the physician in active practise and not upon the physician alone. Surely ignorance of such fundamental laws of health and hygiene as are involved in seeking adequate prenatal care, is also the problem of the school, the church. I can see no reason why such education should not be included in our high school curricula. Neither we, the physicians, nor the educators, nor the clergy are doing all in our power to correct this sorry situation unless we are also doing everything in our power to educate that unfortunate 10,000 before it is too late. If we are not, then we must accept the just indignation of the public as no more than our due.

I am sure no conscientious physician feels other than keenly responsible for the welfare of his own clientele. He should extend that feeling of responsibility beyond the confines of his own group and his own town. He must see that his efforts do not cease until schools, churches, every agency of public welfare, are not only teaching the imperative necessity of prenatal care but teaching it properly and authoritatively. It is actually a disgrace to every intelligent American, no matter what his trade or his profession, that mothers should still be sacrificed to ignorance in this enlightened land.

Some good might be accomplished, I should think, if the local county medical society made an official point of the matter. An official message through the newspapers of each medical society territory to every mother in the territory should be effective. At any rate, the mothers cannot be urged too often through any means at our disposal to seek early care and advice from their family physicians.



President
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

Official Journal Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association, Minnesota Academy of Medicine, and Minneapolis Surgical Society.

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Vol. XIV August, 1931 No. 8

THE DRUGGIST AND THE DOCTOR

An article on the unsatisfactory relations existing between the druggists and doctors entitled "Why Don't We Get Together?" in the July number of the *Northwestern Druggist* offers some food for thought. A number of criticisms of each profession by various members of the other profession form the subject material. As Sir Roger de Coverly was wont to say, "Much may be said on both sides."

We doubt whether the relations between the two professions are as strained as the article might lead one to suppose. The work of the two professions is supplementary, with the same

objective—the patient's interest. Incidentally both groups have to earn a living. Isn't it true that most of us frequently consult some acquaintance in the other profession for information regarding the compounding of prescriptions—a subject that is their specialty? We admittedly know less about pharmacy than our predecessors. The same may be said of the druggists. How many of them are expert pharmacists?

While the physician is admittedly poorly informed on the subject of pharmacy, the pharmacist must in honesty admit his limitations in therapeutics. Counter prescribing by the druggist is surely against the public good, is likely to be useless (another item in the unnecessarily high cost of sickness), and in some instances distinctly harmful. The subject must be viewed, however, with a certain amount of common sense. Certain remedies are and should be sold directly to the public by the druggist. Suggestions on the part of the druggist that the purchaser see a physician for trivial ailments would suggest collusion between the two professions. On the other hand, the medical profession which has declared it unethical for its members to prescribe remedies of unknown composition expects the druggist to step in line.

The evils of self medication will always be with us and will have to be combated by various methods. The practice forms an important item in the cost of sickness which might be prevented. Physicians have come to rely less and less on medicines, so many of which are useless. Most of us limit our prescriptions to the small list of truly efficacious remedies. Incidentally the old time shotgun prescription being a thing of the past the incompatibility of drugs has come to be a matter of minor importance.

It will always be necessary continually to emphasize the foolishness of self medication in all publicity activities. All but a few of the more enlightened newspapers are still offenders in their advertising of fake remedies and the air is full of nauseous fake health remedies. Doubtless the improvement already shown in some quarters will continue.

Substitution and the intentional incorrect fill-

ing of prescriptions is probably the most reprehensible sin on the part of the druggist. The physician is entitled to feel absolute confidence that his patient is getting what his prescription indicated.

We have frequently had a great deal of sympathy for the druggist when he is called upon to fill prescriptions following a tour of the local medical profession by a detail man. New remedies of unproven value have to be stocked for perhaps a single prescription. The druggist feels he must charge enough for the prescription to reduce as much as possible what is likely to be a losing deal.

Drugs as well as the doctor's fee are generally considered an unnecessary expense by the laity and the average individual usually is alive to a charge of a few cents more for a prescription on the part of the uptown druggist, forgetting that he is forced to charge more because of a smaller volume of business, delivery service, et cetera. We know of only one wealthy druggist and, in this instance, only by hearsay. There probably are a few. Those who make a good income doubtless make it on side lines—everything from the postage stamp to the automobile tire.

After all, the solution of these difficulties lies in both groups playing the game according to the rules. It is simple enough for either group to gather instances of infringement by individuals in the other group. Honesty on both sides is all that is necessary.

TETANUS PREVENTION

The Fourth of July is past. So far we have seen no reports of deaths from tetanus following injuries from fireworks. The story of the prevention of tetanus deaths following the idiotic celebration of our national independence day is a fine example of what can be accomplished through specific serum inoculation and publicity. In 1903 there were 406 deaths from tetanus following Fourth of July injuries. This was reduced in 1904 to ninety-one and in 1913 to four. It would be grounds for malpractice if a physician failed to administer tetanus antitoxin fol-

lowing a Fourth of July injury. How about injuries the remaining 364 days in the year?

Unfortunately the results of the administration of tetanus antitoxin in the comparatively few cases of infected wounds encountered by the general practitioner are not striking. He never knows whether he has prevented the development of tetanus or not. One sad experience with an infected wound, and every infected patient receives the inoculation for a time at least.

Tetanus is a strange and subtil infection and strikes when one least expects it. The idea of the rusty nail's causing the infection has been put in the discard. We know that fertilized soil is the chief habitat of the tetanus bacillus. Penetrating wounds furnish the anaërobic soil for its growth. Whether the germ on the skin is driven into the wound or whether the wadding or piece of firecracker contain the germ is not clear. The anaërobic medium in the penetrating wound is probably the important consideration.

Experience during the World War with infected wounds on a large scale demonstrated conclusively the value of prophylactic tetanus inoculation. Occasionally tetanus has developed in spite of one inoculation and therefore a second dose or even weekly doses are recommended for safety.

The case of tetanus reported in this number of the journal is one of a patient that recovered. At the same hospital this year a fatal case occurred, the fatality resulting probably from an anaphylactic reaction. Another reported in the newspaper following a firecracker burn was determined to have been due to cerebral hemorrhages, possibly due to a coexisting encephalitis.

We know of another death from tetanus that occurred in Saint Paul in July in spite of one preventive inoculation and heard of a recent similar case in Saint Cloud.

When once tetanus has developed the treatment has to be rigorous and the mortality is high. Prevention is safer and easier but requires vigilance. It is very easy to become lax in this matter. Because of a seeming increase in the incidence of the infection attention is called to the importance of its prevention, by at least two inoculations at a week's interval.

OBITUARY

Dr. J. J. O'Hara 1868-1931

The death of Dr. J. J. O'Hara, Janesville, Minnesota, president of the Waseca County Medical Society for the year 1931, occurred at his home July 6, 1931. Death was caused by coronary thrombosis. Dr. O'Hara was sixty-three years of age at the time of his demise.

Dr. O'Hara was born February 8, 1868, at Edinburgh, Scotland, the son of Mr. and Mrs. James O'Hara. He came to Canada as a young man, and entered Queens University at Kingston, Ontario, from which institution he received his degree as a physician and surgeon in 1898. The same year he came to Alma City, where he engaged in the practice of medicine until a few years later, when he moved to Janesville.

Always active in civic matters, Dr. O'Hara has served for a number of years as president of the local library board, as officer of the county Red Cross organization and as president of the county medical association. He was a member of long standing in the Masonic order, the Modern Woodmen of America and the Royal Neighbors. He is survived by his wife and two sons, Bruce A. O'Hara, of West Allis, Wis., and D. M. O'Hara of Saint Paul.

Dr. L. A. Fritsche 1862-1931

Dr. L. A. Fritsche, veteran New Ulm physician and surgeon, died at his home June 18, 1931. Death followed an illness resulting from a collapse last November which occurred while Dr. Fritsche was making one of his closing speeches in his campaign for Congressman of the Second district, as farmer-labor candidate.

Dr. Fritsche was born on a farm in Lafayette township, Nicollet county, May 28, 1862. His parents, the late Mr. and Mrs. Frederick Fritsche, were prominent pioneer settlers of that community. After spending his boyhood on the farm, and finishing the rural school, Dr. Fritsche attended St. Peter High school, before entering the medical college of the University of Michigan, at Ann Arbor.

He was graduated from the medical school in 1887, the year Minnesota's medical practitioners' licensing statute became effective. Although not required to pass the Minnesota State Board of Medical Examiners, due to the fact that he had received his degree before the law went into effect, he decided to take the prescribed examination, passed it, and received the first license to be issued by the board.

Returning to New Ulm, Dr. Fritsche practiced his profession there for one and one-half years, and then went to Germany, to take a postgraduate course at the University of Berlin, which he completed in 1890. Thereupon he came back to New Ulm, and had since practiced medicine and surgery there, being the oldest resident physician, in years of service to the community, at the time of his death. Dr. Fritsche was the first

in that section to employ aseptic and antiseptic surgery, and was one of the first surgeons in Minnesota to perform an appendectomy operation.

Dr. Fritsche was a member of the State Board of Medical Examiners from 1900 until 1902.

While Dr. Fritsche's practice was very extensive, he still found time to take a keen interest in political and civic affairs. He was first elected mayor of New Ulm in 1912, and served as chief executive for ten years.

While attending Berlin university, Dr. Fritsche was a member of the 10th International Medical Congress, which convened in that city in 1890, and presented two cases in the English language to the Gynecological section for Prof. Dr. Alfred Dührssen. He served as health officer of New Ulm from 1891 to 1894, and held many other public offices of his town and county.

Dr. Fritsche was one of the organizers of the farmer-labor political movement in New Ulm, and his counsel was eagerly sought by the leaders of that party in Minnesota. He was a candidate for governor, under the farmer-labor banner, in the primary elections of 1924 and 1928, and was candidate of his party for congress from that district last fall. In 1922 he entered the race for the farmer-labor nomination for United States senator.

In the death of Dr. Fritsche, New Ulm and the state lose one of their foremost citizens, who was loved and respected by all who knew him. A pioneer physician, before the advent of the automobile and good roads, he cheerfully responded to calls for his services, not only from patients in New Ulm and immediate vicinity, but in a large radius, regardless of weather, winter and summer. He sacrificed much for those dependent upon him for medical aid.

Another exemplary characteristic was his readiness to help the needy, and he gave liberally to every worthy cause.

Dr. Fritsche's generosity was almost a fault. No one in need came to him in vain. He gave liberally of his means, but did so unostentatiously. He also contributed generously of his time and efforts to civic enterprises, never being too busy to do even more than his share toward furthering the welfare of his community and the state.

Dr. Fritsche was married in Berlin, Germany, June 14, 1890, to Miss Amalie Pfaender, daughter of the late Colonel and Mrs. William Pfaender, Sr., his surviving widow. To this union, seven children were born, two of whom preceded their father in death, namely, Alexander Frederick, who died in infancy, and Dr. William Fritsche, who passed away in 1923. The five living sons and daughters are: Mrs. H. W. Bond, White Plains, N. Y.; Drs. Albert and Carl Fritsche, who were associated with their father in the Fritsche clinic here; Miss Louise Fritsche, who recently received her degree as master of arts from Columbia University, New York; and Dr. Theodore Fritsche, interne at Letterman Army Hospital, San Francisco, Calif. There also are three grandchildren, as well as the following brothers and sisters: Mrs. William Mueller, St. Peter, and Emil and Otto Fritsche, Lafayette township.

A PAGE FORUM OF THE COMMITTEE ON PUBLIC HEALTH EDUCATION

A Doctor Talks to Social Workers

An important and much needed plea for better and closer coöperation of public health workers with the family physician was made in Minneapolis recently before the National Conference on Social Work by E. A. Meyerding, St. Paul, Secretary for the State Association.

At the moment Dr. Meyerding was speaking as the head of the Christmas Seal organization of Minnesota and his observations were not those of a representative of organized medicine but of an experienced public health worker addressing other public health workers and social service workers. The talk was therefore bound to be particularly effective—another instance, in fact, of the successful working of the unique liaison between public health agencies and organized medicine in our State.

Below are reprinted a few pertinent excerpts of the talk, which reached many conference delegates from all parts of the United States.

"Time was when we public health workers were content if one or maybe two medical men in the community interested themselves in our work. If the rest of the practicing medical profession seemed indifferent or antagonistic to the work, we took it as part of the inevitable state of things and did nothing.

"We know now that such a state of things is wholly unnecessary. We know, also, that we cannot now and never did accomplish anything of lasting worth that had not the approval and help of the family physician.

"It is well for us to remember, in the first place, in these days of long and intensive training for the practice of medicine, that we cannot hope to discover any other group engaged in health work with the knowledge and training possessed by this especially qualified class.

"Furthermore—and this is an angle of the question that needs great emphasis now and then—the lay worker must remember that the most indifferent and apparently under-qualified medical practitioner in an obscure country community is bound to know a good deal more about health in general and about his community in particular than the best informed and the most enthusiastic of lay health workers.

"Any state program such as ours, involving such projects as diphtheria inoculation or Mantoux tuberculin testing, is ended, so far as our active participation is concerned, when the few days of testing or clinics are past. If the medical men of the community have not already been persuaded of the value of the project, if their aid has not already been enlisted through the regular channels, both at the time of the clinics and after, then our own time and money and enthusiasm have been worse than wasted.

"We have found in the Minnesota Public Health Association that if our program is conservative and scientifically sound the medical men have been more than willing to accept and endorse it. As local distributor of health, the doctor has as much pride and interest in all local health movements as the lawyer or the hardware man or the grocer or the druggist or banker have in their special fields. The smaller the community the more justly the medical man may feel that he is, after all, the logical guide in these matters for his friends and neighbors.

"In any case our part as a semi-official health agency has been strictly education. The best that we can do to further the use of the Mantoux test, for instance, is to demonstrate it for the laity, for the public health official and for the doctor. We must show all of these how it works, what its benefits may be expected to be. If we fail to prove our point to the regular medical practitioner we have failed in the most important part of our program. Our work becomes a trivial fruitless business, something new to occupy field workers and annoy busy doctors—of no use at all in the fight against disease."

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MEDICAL BROADCAST FOR THE MONTH

The Minnesota State Medical Association Morning Health Service.

The Minnesota State Medical Association broadcasts weekly at 11:15 o'clock every Wednesday morning over Station WCCO, Minneapolis and Saint Paul (810 kilocycles or 370.2 meters).

Speaker: William A. O'Brien, M. D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota.

The program for the month of August will be as follows:

August 5—End-results of the Treatment of Overweight.

August 12—Mongolian Idiocy.

August 19—The Liver Treatment of Pernicious Anemia.

August 26—The Occupational Factor in Cancer.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

Through the kindness of Headmaster Charles W. Newhall the facilities of the Shattuck School have been turned over to the members of the Southern Minnesota Medical Association and their friends, for the annual meeting, which is to be held at Faribault in the Shattuck School on August 24.

PROGRAM

MORNING SESSION

8:00 A. M.—School for Feeble-minded

Demonstration of mental cases—J. M. Murdoch, M.D., and Staff

9:00 A. M.—Shattuck School

Pediatric clinic—E. D. Anderson, M.D., Minneapolis

X-ray demonstration—R. G. Allison, M.D., Minneapolis, and C. G. Sutherland, M.D., Rochester

Varicose vein clinic—R. C. Logeheil, M.D., Minneapolis

Demonstration of psychometric tests—Fred Kuhlman, M.D., Minneapolis (Director Division of Research of the Minnesota State Board of Control)

Dermatologic clinic—P. A. O'Leary, M.D., and Staff, Rochester

11:00 A. M.

Pathologic demonstration—H. E. Robertson, M.D., Rochester, and A. M. Snell, M.D., Rochester

Hematology demonstration—F. J. Heck, M.D., Rochester, and C. H. Watkins, M.D., Rochester

Unusual case reports—Discussion led by Moses Barron, M.D., Minneapolis

Case of a large gall stone causing intestinal obstruction—B. J. Gallagher, M.D., Waseca

Case of streptococcic septicemia with recovery—O. J. Swenson, M.D., Waseca

Sarcoma of the jaw in a three-weeks' old infant, and albuminuria in pregnancy—C. C. Leck, M.D., Austin.

Others to be announced later.

AFTERNOON SESSION

2:00 P. M.

Normal and abnormal motility syndromes of the upper urinary tract with indications for drug and sympathectomy therapy—W. P. Herbst, M.D., Minneapolis

Selection of patients for prostatectomy—Hugh Cabot, M.D., Rochester

The injection treatment of hemorrhoids: some fallacies and complications—Walter Fansler, M.D., Minneapolis

Carcinoma of the bronchus—P. P. Vinson, M.D., Rochester

Analysis of 600 cases of spinal anesthesia—W. C. Stillwell, M.D., Mankato

Paper—S. W. Harrington, M.D., Rochester

Treatment of pneumonia—H. A. Reimann, M.D., Minneapolis

And others

BANQUET

6:30 P. M.—Banquet Hall, Shumway Hall, Shattuck School

President's address—J. T. Schlesselman, M.D., Mankato

Address of welcome—C. W. Newhall, Headmaster, Shattuck School

Remarks—W. A. Rohlf, M.D., Waverly, Iowa, (President, Iowa State Medical Association)

Talk on Russia illustrated by movie films—T. L. Birnberg, M.D., St. Paul Amphitheater, Shumway Hall, Shattuck School

It has been suggested that possibly many members would like to come to Faribault on Sunday afternoon. There is an excellent golf course, tennis courts, and swimming pool which may be used on Sunday afternoon and any time Monday. Luncheon will be served at the Shattuck School, as will dinner, and there is ample space for parking.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

A distinguished and varied program of scientific and social events has been arranged for the Northern Minnesota Medical Association meeting to be held at Hibbing, on Monday, September 14, 1931.

A trip into the open pit of the mine and a tea for Auxiliary members are among the events scheduled for the day.

Scientific sessions will be held at the Androy Hotel. The first will be a clinico-pathologic conference by Dr. M. M. Fischer, internist; Drs. G. L. Berdez, pathologist; Gage Clement and J. R. McNutt, roentgenologists, with discussions led by Dr. E. L. Tuohy, all of Duluth.

Dr. L. R. Gowan, Duluth, will read a paper on

"Multiple Sclerosis," and Dr. O. W. Rowe, Duluth, will talk on "Pediatrics."

Dr. D. C. Collins and Dr. John S. Lundy, Rochester, will talk respectively on "Peptic Ulcer" and "Modern Phases of Anesthesia." Dr. A. N. Snell, also of Rochester, will talk on "What the American Doctor Sees in Europe." Dr. Thomas Myers, of St. Paul, will talk on "Pathology of the Newborn" and Dr. W. H. Hengstler, also of St. Paul, on "Remote Effects of Head Injuries." Dr. N. O. Pearce, Minneapolis, will repeat the paper, with slides, on Medical Economics, which he gave at the State meeting in May.

Dr. M. S. Henderson, Rochester, President-Elect of the Minnesota State Medical Association, and a mining engineer recently returned to America from Russia, will appear on the evening program.

Dr. B. S. Adams, Hibbing, and Dr. E. K. Smith, of Duluth, are in charge of the program.

UPPER MISSISSIPPI SOCIETY

More than thirty physicians and their friends from various parts of the district attended the summer meeting of the Upper Mississippi Medical Society held at International Falls on Saturday, July 18, 1931.

An important Scientific program in the Masonic Hall at International Falls occupied the morning. A fish dinner at the Rainy Lake Hotel at Fort Frances, Ontario, and a delightful four hour boat excursion on Rainy Lake, with stops at some of the fine Rainy Lake summer estates, were on the day's schedule.

An intense interest on the part of everybody present in the affairs of the society and organized medicine in general and in the papers presented was an outstanding feature of the meeting. On the program were:

Dr. E. A. Meyerding, St. Paul, "What's Doing in Your State Medical Society"; Dr. P. F. Eckman, Duluth, "Secondary Anemias"; Dr. Donald Creevy, Minneapolis, "Prostatic Obstruction"; Dr. Karl Anderson, Minneapolis, "Treatment of Nephritis"; Dr. L. R. Gowan, Duluth, "Localization of Spinal Cord Tumors"; Dr. W. W. Lewis, St. Paul, "Inflammatory Infection of the Middle Ear"; Dr. Paul G. Bohman, Duluth, "Newer Methods of Diagnosis in Diseases of the Lung."

Many of those who attended remained in the North for several days to finish their vacations.

WABASHA COUNTY SOCIETY

The sixty-third annual meeting of the Wabasha County Medical Society was held at Lake City, Minnesota, Thursday, July 9, 1931.

The scientific program was carried out as published in the July number of MINNESOTA MEDICINE.

The following officers were elected to serve for the coming year: President, Dr. W. F. Wilson, Lake City; vice president, Dr. W. B. Stryker, Plainview; secretary-treasurer, Dr. Russell H. Frost, Wabasha; delegate to State Association, Dr. H. E. Bowers, Lake City; alternate, Dr. D. P. Dempsey, Kellogg; censor for three years, Dr. W. J. Cochrane, Lake City. The other censors are Dr. J. F. Bond, Wabasha, and Dr. J. A. Slocum, Plainview.

It was voted to hold the next annual meeting at Plainview. Dinner was served at the Hotel Lyon through the courtesy of the Lake City members of the Society was present to discuss with a similar committee twelve members and affiliates, four visiting physicians, two laymen, and the ladies accompanying.

Following the dinner and picture feature captivatingly presented by Dr. Thomas S. Roberts of the University, the ladies were given a boat ride on Lake Pepin.

A committee from the Winona County Medical Society was present to discuss with a similar committee from the Wabasha County Society the advisability of amalgamation of the two societies.

A resolution was drawn up favoring such merger, and is to be submitted to each member of the two societies for vote.

Following the address of Dr. E. C. Bayley, which stressed the necessity of pure milk as a preventive of several diseases, action was taken toward securing pasteurized milk for all places in the county not already afforded such supply.

In line with the present teaching regarding humidity as a health factor in winter heating, a newly devised and comparatively inexpensive humidifier was demonstrated to those in attendance.

The usual vote of thanks was tendered all those who had a part in the entertainment of the society.

W. F. WILSON, *Secretary*.

WOMEN'S AUXILIARY *Minnesota State Medical Association*

President—Mrs. S. S. Hesselgrave, St. Paul
Chairman Press and Publicity—Mrs. E. A. Meyerding, St. Paul
Editor—Mrs. A. A. Passer, Olivia

Two Minnesota women were elected to national offices in the Women's Auxiliary of the American Medical Association at the meeting in Philadelphia, which was held from June 8 to June 12: Mrs. James Blake, Hopkins, Vice-President; and Mrs. Sherman S. Hesselgrave, Saint Paul, Recording Secretary.

LYON-LINCOLN COUNTY AUXILIARY

Mrs. S. S. Hesselgrave, St. Paul, recently elected recording secretary of the Women's Auxiliary to the American Medical Association and former president of the Women's Auxiliary to the Minnesota State Medical Association, assisted in the organization of the Lyon-Lincoln County Medical Society Auxiliary at Marshall, Minnesota, on June 29, 1931.

The occasion was a joint dinner between medical society members and the new women's group. Following the dinner the two groups held separate meetings. Mrs. Hesselgrave was introduced to the women's meeting by Dr. W. G. Workman, Tracy, Minnesota. Dr. E. A. Meyerding, St. Paul, Secretary of the State

Association, also talked to the women on "The Uses of the Auxiliary."

The following officers of the new organization were elected: Mrs. W. W. Yaeger, Ivanhoe, President; Mrs. Peter Hermanson, Hendricks, Vice-President; Mrs. W. G. Workman, Tracy, Secretary, and Mrs. W. H. Valentine, Tracy, Treasurer.

NEW AND NON-OFFICIAL REMEDIES

The following products have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in New and Non-official Remedies:

Syrup No. 112 Ephedrine Hydrochloride.—It contains ephedrine hydrochloride-Lilly (New and Non-official Remedies, 1931, p. 175), 0.22 Gm., in 100 c.c. (1 grain per fluidounce), and alcohol, 12 per cent. Eli Lilly & Co., Indianapolis, Ind.

Quiniobine.—Quinine bismuth iodide rendered soluble in olive oil by means of lecithin. Each c.c. contains 0.03 Gm. of bismuth, 0.03 Gm. of quinine, 0.075 Gm. of iodine, and 0.22 Gm. of lecithin. Quiniobine is proposed as a means of obtaining the systemic effects of bismuth in the treatment of syphilis (New and Non-official Remedies, 1931, p. 94). It is claimed that, since in Quiniobine the quinine bismuth iodide is soluble, the injections are usually only slightly painful and the dosage is more accurate than with suspensions of quinine bismuth iodide. It is supplied also in the form of 2 c.c. ampules. Spicer & Co., Glendale, Calif. (Jour. A. M. A., June 6, 1931, p. 1953.)

Calcium Gluconate.—It contains calcium equivalent to not less than 12.4 nor more than 12.8 per cent of calcium oxide. Calcium gluconate is used to obtain the therapeutic effects of calcium. It is more palatable than calcium chloride for oral administration and for hypodermic or intramuscular use is non-irritant.

Calcium Gluconate-Pfizer.—A brand of calcium gluconate-N.N.R. Chas. Pfizer & Co., Inc., Brooklyn, N. Y.

Concentrated Pollen Antigens-Lederle.—Liquids obtained by extracting the protein from the pollen of plants with a liquid consisting of 67 per cent of glycerin and 33 per cent of a buffered saline solution. For a discussion of the actions and uses, see Allergic Protein Preparations, New and Non-official Remedies, 1931, p. 23. Concentrated pollen antigens-Lederle are marketed in packages of fifteen syringes containing increasing dosages; also in supplementary treatment packages of five syringes. The following product has been accepted: Concentrated Pollen Antigen (Lederle) Ragweed Combined (Common and Giant Ragweed in equal parts). Lederle Laboratories, Inc., Pearl River, N. Y. (Jour. A. M. A., June 13, 1931, p. 2036.)

FOODS

The following products have been accepted by the Committee on Foods of the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in Accepted Foods:

SMACO (206) Powdered Whole Milk (S. M. A. Corporation, Cleveland).—A powdered spray-dried whole milk hermetically sealed in tins in an atmosphere of nitrogen. It is claimed by the manufacturer that each 12 ounce can will make 2.8 quarts of liquid milk of normal strength.

Firch's Ma Made Bread (Sliced and Unsliced) (Firch Baking Company, Inc., Erie, Pa.).—A white bread (sliced and unsliced) made by the sponge dough method. (Jour. A. M. A., June 6, 1931, p. 1953.)

Torex (Concentrated Beef Bouillon) (International Products Corporation, New York City).—A semifluid mixture of beef extract, salt, vegetable extract, starch and powdered white pepper and onion; packed in block-tin tubes. It is claimed that this product dissolves instantly in hot water, that it permits the quick preparation of a warm drink for the home and camp table and that it is adapted for seasoning gravies, stews, etc.

Bowey's Hot Chocolate Powder (Bowey's Inc., Chicago).—A mixture in powdered form of chocolate liquor, cane sugar and skim milk flavored with vanilla extract. It is claimed that this product makes a wholesome and delicious beverage of high caloric value which can be used in the preparation of delicious desserts.

Libby's Sterilized Unsweetened Evaporated Milk (Libby, McNeil and Libby, Chicago).—An unsweetened evaporated milk. It is claimed that this product approximates ordinary milk when diluted with an equal volume of water. It is proposed for use in infant feeding and may be used in cooking and baking as is ordinary milk. (Jour. A. M. A., June 13, 1931, p. 2037.)

Merrell-Soule Powdered Protein Milk (Merrell-Soule Co., Inc., New York City).—A powdered food made from milk; higher in protein and lactic acid and lower in lactose than dry whole milk. It is claimed that when restored to liquid form with water it closely approximates Finkelstein's protein milk formula. It is said to be indicated in cases of dyspepsia, alimentary intoxication, marasmus and celiac diseases.

Mead's Powdered Lactic Acid Milk Noncurdling No. 2 Plain (Mead Johnson & Co., Evansville, Ind.).—A powdered, spray-dried homogenized milk containing added lactic acid. It is claimed that the powder may be readily mixed with cool or hot water to form a fine suspension. The mixture may be boiled without curdling or change of color or taste. It is recommended for infant feeding.

Paul's Redi-Sliced Bread (Paul's Baking Corporation, Chicago).—A white bread made by the sponge dough method, in sliced loaf form. It is claimed to be a bread of good quality. (Jour. A. M. A., June 20, 1931, p. 2104.)

Saylor's Hom-Aid Bread (Saylor's Bakery, Inc., Tamaqua Heights, Tamaqua, Pa.).—A white bread made by the sponge dough method. It is claimed to be a bread of good quality.

Kwality Twin Loaf Bread (Kwality Baking Company, Champaign, Ill.).—A white twin-loaf bread made by the sponge dough method. It is claimed to be a bread of good quality. (Jour. A. M. A., June 27, 1931, p. 2197.)

CONSULTATION BUREAU

WM. A. O'BRIEN, M.D., *Director*

Minnesota State Medical Association

11 West Summit Avenue

Saint Paul, Minnesota

1. *Question.*—A young man, 23 years of age, college graduate, teaches school in winter and works on a farm in summertime. He recently had a complete examination at a clinic and a diagnosis of recurrent hemorrhages of the right eye into the vitreous with retinitis proliferans was made; the cause probably being tuberculosis. General examination, including an X-ray of the chest, is essentially negative. Had a very markedly positive tuberculin reaction but appears to be in excellent physical condition.

Vision is normal in both eyes. The right fundus examination shows fine floating opacities in the vitreous. The nasal half of the disc is obscured by a thin vascularized membrane of connective tissue extending two or three disc diameters above and below the disc and also into the vitreous. There are two small linear hemorrhages and a small area of proliferation about the periphery of the fundus. The fundus examination of the left eye is negative.

1. Is it probable that this condition will go on to blindness, and are there any definite measures that might prevent blindness?

2. In addition to hygienic measures tending to build up natural resistance, including ultraviolet irradiation, high vitamin diet and cod liver oil, is the gradually increasing dosage of old tuberculin considered good treatment? Should the patient derive immediate benefit from the same, or must it be continued over a period of several years?

3. In the matter of this man doing farm work in the summer, should any restrictions be placed on strenuous or severe work? Is it likely that hard work might increase the hemorrhages into the eye?

4. Are there any other therapeutic measures that might be used, such as the non-specific foreign protein injections?

Answer.—1. The tendency is for this condition to recur, with progressive loss of vision. It is probable that eventually the entire sight of the affected eye will be lost.

2. Systemic measures are very important, and you have outlined very well those which should be included in the treatment. Old tuberculin is not recommended, although used by some ophthalmologists. The tendency for reaction to occur is too great and those who use it are probably in the minority. It is not recommended for your patient.

3. Farm work, especially the more strenuous part, is not indicated. He should be advised to try some other summer occupation.

4. Boiled milk injections should be given. Inject from 10 to 15 c.c. of boiled milk, intramuscularly. Before you do this, take the leukocyte count and follow it at definite intervals, say every two days thereafter. When the count returns to normal, give a second injection. Three or four such injections should be given, followed by a rest for a month or so and then the treatment continued. In any event, the prognosis for complete preservation of vision is not good.

2. *Question.* Carpenter, 65 years, consulted me not long ago because of pains in various parts of the

body and regurgitation of mucus in the morning. He has been ill for about a year. The pains are located chiefly in the muscles of the extremities and in the bones of the lower back region. They come and go, but are severe enough to keep him awake at night. He never vomits food, but brings up slime. When this material is out of the way, he is able to eat. Appetite is poor and he is constipated. There has been apparent marked weight loss in the past year. About three months ago he had a spell which was called a "stroke" by his physician. At that time his speech became indistinct and his tongue protruded to one side. No other paralysis noted. Speech difficulty partially improved. Slight unproductive cough and generalized chest pain for the past year. For several years he has had difficulty in urination. The stream became slower and nocturia developed. Physical examination is as follows: Blood pressure 130/70. Pulse 92. Temperature 97.8. The appearance is cachectic, tongue protrudes definitely to right side. No chest rales. There is definite widening of the upper sternal dullness, loud booming first tone at apex. No abdominal masses. Definite tenderness to percussion over sacrum. Rectal examination shows prostate to be only moderately enlarged, but there are a few small, hard nodules present, especially in the mid-portion. The knee and ankle reflexes are absent on the left. The upper extremity reflexes are present and equal. Hemoglobin 76 per cent, leukocyte count 11,600. Urine negative. Gastrointestinal X-ray study negative. X-ray of the chest, skull, pelvis and lumbar spine show hazy, punched-out areas in the bone and new bone formation. There are, also, definite soft shadows in the lungs. May we have your opinion in this case?

Answer.—The lesions in the lungs and bones are metastatic tumor deposits, and are both of the osteoclastic and osteoblastic types. From the X-ray standpoint alone, the diagnosis is metastatic carcinoma, probably from a tumor in the prostate gland. Multiple myeloma must also be considered, but the chest findings are against this diagnosis. Other metastatic tumors may show a similar picture, e.g., a silent hypernephroma cannot be ruled out. From your description of the condition of the prostate it is most likely the source of metastasis. If the pain is severe, deep X-ray treatment is very helpful. While it may not influence the course of the disease it does make the patient feel better. Unless signs of urinary obstruction develop, no prosthetic treatment is indicated. If obstruction takes place, a cystostomy can be done. Carcinoma of the prostate frequently acts like your description of this patient. The outlook is unfavorable, but the disease may progress rather slowly. The question of metastatic brain tumor as a cause of the stroke should also be considered. If the lesions in the brain are multiple tumor deposits, a diffuse reaction, chiefly inflammatory, resembling encephalitis, may be observed. The possibility of this development is strengthened by a personality change. It is most probable that the brain lesion is an accident and unrelated to the malignant condition.

OF GENERAL INTEREST

Dr. Arthur R. Kintner has moved from Rochester, Minnesota, where he was associated with the Mayo Clinic, to 1004 Central Avenue, Nebraska City, Nebraska.

Dr. and Mrs. Myron O. Henry have returned from Europe, where Dr. Henry spent three and one-half months in various clinics. He attended the meeting of the German Surgical Society in Berlin, the French Orthopedic Society at Berck-Plage, and also the British Orthopedic Society at Aberdeen, Scotland.

Dr. William Harold Ford, who is a graduate of the University of Minnesota, class of 1931, and who completed his Internship at Ancker Hospital, Saint Paul, July 1st, has opened an office at 5161 Bloomington Avenue South, Minneapolis, for the general practice of medicine and surgery.

Members of the Association are urgently requested to look among their old papers and into the local medical archives for the transactions of the Minnesota State Medical Association of the years 1865, 1887 and 1888. These papers are missing from the otherwise complete documentary history of the Association, and the state office will be greatly obliged to anyone who can supply them.

Dr. and Mrs. C. J. Plonske of Faribault recently returned from an extended tour by auto through the southeastern and eastern states, returning by way of Montreal. Attendance at the American Medical Association meeting in Philadelphia was included in the trip. Dr. and Mrs. Plonske were accompanied by their daughter, Marion, and by Mrs. Plonske's father, Mr. F. H. Clarke of Minneapolis.

Dr. F. S. Warren, who discontinued practice in Faribault last fall, upon the occasion of a visit to Faribault in June with his wife and daughter, tendered a dinner to the physicians and nurses of the city. Dr. Warren gave an interesting account of his recent automobile trip to Florida, and numerous humorous and interesting speeches by those in attendance rendered the occasion most enjoyable. Dr. Warren left early in July for a tour of the West.

Among summer epidemics of interest to the doctor in Minnesota this year, is an unusual outbreak of malpractice suits.

The most effective protection against this epidemic is malpractice insurance carried by every member of the Minnesota State Medical Association. Such insur-

ance may be obtained in the Aetna through our group policy as well as in several other good companies.

By all means, see that your malpractice policy has not lapsed. Remember also that what you say about your fellow practitioner may well start a malpractice suit.

Twenty-one out of 42 reports from probate judges in Minnesota counties indicate that officials are wholly in favor of organized medicine and eager to cooperate with its membership.

This desirable state of things is revealed in the interesting reports that are coming in to the state office these days following the bestowal through members in the county seats of the 1931 rosters of the association upon all county judges of probate in the state.

Of the other 21 reported, only four seemed to the members concerned to be definitely indifferent or uninterested in the state association and organized medicine in general.

Many enthusiastic statements were quoted from the 21 friendly judges by reporting members.

"Thank you. That is fine! said the Judge," reports the Stillwater member. "He thinks an M.D. not belonging to a county society is like a lawyer not belonging to the bar association and NO GOOD."

Other emphatically friendly officials were discovered in Detroit Lakes, St. James, Windom, Owatonna, Crookston, Little Falls, St. Cloud, Chaska, Wheaton, Ortonville, Glencoe, Cambridge, New Ulm, Marshall, Two Harbors and Worthington.

Several judges in the various counties were not approached at all, mainly for the reason that, all of the physicians in the county being members of the association, the members felt sufficiently assured of official cooperation anyway.

Two judges were reported in their dotage as a sufficient reason for lack of active interest in the matter. Another was rather astonishingly quoted as surprised to know that there was such a thing as a medical organization. Such a thing as expressing himself adverse to organized medicine was beyond the scope of his comprehension.

The following, who have been serving as internes at the Ancker Hospital, Saint Paul, the past year, are listed with their present positions and locations:

Dr. William R. Yeager is in general practice at Parkersburg, W. Va.

Dr. Waldemar G. Johanson is resident on the Receiving and Medical services at Ancker Hospital.

Drs. John P. Burgess, Viktor O. Wilson, and Alfred G. Ouellette are residents at the Children's Memorial Hospital, Chicago, Ill.

Dr. Harvey J. Brekke is resident at St. Luke's Hospital, Saint Paul.

Dr. W. Harold Ford is in general practice at 5155 Bloomington Ave. So., Minneapolis.

Dr. Thomas A. Starkey is a Fellow in medicine at the Mayo Clinic, Rochester.

Dr. Morris Greenberg is in general practice in Saint Paul.

Dr. William H. Lamberson is doing post-graduate work in otolaryngology at the University of Pennsylvania, Philadelphia.

Dr. J. Marshall Neely is resident pathologist at the Ancker Hospital, Saint Paul.

Dr. Harold L. Bolender is resident at the Midway Hospital, Saint Paul.

Dr. Richard S. Rodgers is a resident in Medicine at the Minneapolis General Hospital.

Dr. O. Harold Muus is associated with the Engstad Clinic, Grand Forks, N. D.

Dr. Willis M. Duryea is resident in pediatrics at the Abbott Hospital, Minneapolis.

Dr. Charles H. Slocumb is a Fellow in medicine at the Mayo Clinic.

Dr. Roy L. Robertson is in general practice at Mill Valley, California, with Dr. George Landrock.

Dr. William L. Pratt is resident on the receiving and medical services at Ancker Hospital.

Dr. George L. Shivers is doing post-graduate work at the University of Minnesota and the Mayo Clinic.

Dr. Cecil A. Warren, who has been the resident on the surgical service at the Ancker Hospital, is now in general practice at 373 New Lowry Medical Arts Bldg., Saint Paul.

Dr. J. Chester Ogden is now resident at Bethesda Hospital, St. Paul.

Dr. Arthur L. Osborn, who has been resident urologist at Ancker Hospital, is specializing in genito-urinary diseases in Kansas City, Mo.

Dr. Merle O. Thoreson, who has been resident on the medicine-receiving service at Ancker Hospital, is now resident in surgery at the same hospital.

Dr. C. Henning Mattson, who has been resident on the medicine-receiving service at Ancker Hospital, is now affiliated in general practice with Dr. Olof I. Sohlberg, 564 Lowry Medical Arts Bldg., Saint Paul.

STATEMENT REGARDING THE DISCOVERY OF THE DEAFENED PRE-SCHOOL CHILD ISSUED BY THE HEALTH COUNCIL OF MINNEAPOLIS

Population centers in which work is being done for the discovery of deafened pre-school children have been notably fruitful of results. We feel sure that in this respect Minneapolis is not an exception to the general rule. Many such children are discoverable and oftentimes remediable.

We have found, and we have been repeatedly admonished by other observers, that it takes *positive* inquiry to bring out the facts of such deafening in many cases; that parents are often careless themselves in noting the loss of hearing in their young children; and that if they do discover such loss they are frequently inclined to conceal the fact of the existence of such a handicap.

They are apt to think, too, that nothing can be done about it, when as a matter of fact very much can be done in these early years, when body and mind are still in the making; when the consequences of the diseases which cause deafening are most readily overcome by

the otologist; when hearing and voice can be most readily trained; when lip-reading can be very easily taught to the young child and even by the interested mother.

We have already invited your coöperation in a joint effort being made by The Health Council, the Minneapolis League for the Hard of Hearing, and the Health and Social Agencies of the City, to find and to help these deafened little ones who, left alone, will, in a very large majority of cases, grow worse and will lay the foundation in childhood years for the development of adult deafness in days to come.

Will you not give us welcome further aid in this discovery, by teaching your health and relief workers the technic of search in the home, the family, the day and the nursery schools and the kindergarten? Will you not promptly advise the Executive Secretary of the Minneapolis League for the Hard of Hearing, in the Plaza Hotel, of your findings? She will do the rest, with the help of her co-workers, and the otologists, lip-readers and voice culturists. The results will be the relief of the young deafened children of today; the carrying-forward of the retarded children of the present and of the future; the saving of hearing impairment and its limitations among the adults of the near future.

Physicians, public health nurses, and teachers are also invited to aid by the reference of any such deafened children of pre-school age, who may be guided to the care of the otologist, and to the lip-reading teacher, and to the voice-trainer.

THE EDITOR'S SONG

If you have a tale to tell,
Boil it down!
Write it out and write it well,
Being careful how you spell;
Send the kernel, keep the shell;
Boil it down! Boil it down!

Then, when all the job is done,
Boil it down!
If you want to share our fun,
Know just how a paper's run,
Day by day from sun to sun,
Boil it down! Boil it down!

When there's not a word to spare
Boil it down! Boil it down!
Heave a sigh and lift a prayer,
Stamp your foot and tear your hair,
Then begin again with care—
Boil it down! Boil it down!

When, all done, you send it in,
We'll boil it down.
Where you end there we begin;
This is our besetting sin;
With a scowl or with a grin,
We'll boil it down; boil it down.

—The Presbyterian Advance.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of May 13, 1931

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club, Saint Paul, on Wednesday evening, May 13, 1931. Dinner preceded the meeting, which was called to order by the President, Dr. J. S. Gilfillan, at 8 P. M.

There were forty-eight members and four guests present.

Minutes of the April meeting were read and approved.

Dr. H. L. Ulrich read the Necrology Committee's memorial to Dr. Theodor Bratrud.

THEODOR BRATRUD, born in 1873, raised and educated in Minnesota, a son of the "Giants in the Earth," carried on the Viking spirit. Into the wheat fields of northern Minnesota he brought the knowledge of the expert, the kindness of the great, the humility and understanding of the prairies. His clinic was a haven of comfort and salvation to the afflicted of three states. Theodor Bratrud in his diverse parts might have been the prototype of the doctor in Sinclair Lewis' "Main Street"; in Ian Maclaren's "Beside the Bonnie Briar Bush"; in Joseph Collins' "The Doctor Looks at Literature." In his passing, one of the intrepid spirits of this state has unfurled his banner in its legendary halls.

A poet describes him in these lines:

"A simple man, yet none in all the land
More great. For he was ever found apart
Where beds of human suffering grimly stand;
And there, with soul alert, he lived his art—
The tender gift of healing in his hand
And God's sweet law of service in his heart."

We, the members of the Academy of Medicine, confrères of Theodor Bratrud, thus pay tribute to his memory.

We further move that a copy of this be spread on the minutes of the Society and a copy be sent to his sister, Miss Luela Bratrud of Thief River Falls, Minnesota.

(Signed) F. E. BURCH,
A. SCHWYZER,
H. L. ULRICH, *Chairman*.

The scientific meeting was as follows:

DR. A. W. IDE (St. Paul) reported the following case:

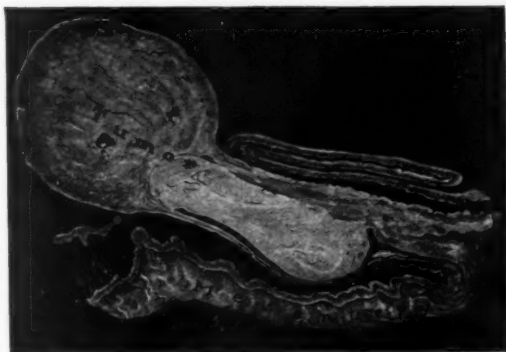
The patient, a married woman 41 years old, was first seen April 27, 1931, on account of acute abdominal distress. This patient had had six children who are all living and well. She had had no previous illnesses; neither had she had any injuries. Four years ago she had an abdominal operation elsewhere. The uterus was removed supravaginally on account of uterine bleeding. Her recovery from this operation was uneventful.

Five weeks ago the present trouble began. There was abdominal distress with some tendency to nausea.

There was obstinate constipation which gradually became worse. There was not a complete obstruction but the amount of stool passed was small and there was some blood.

When we first saw the patient she was having rather acute abdominal pain, evidently due to obstruction of the bowel. The exact nature of the obstruction could not be determined, but in view of her previous abdominal operation it was thought possible that the obstruction was due to adhesions resulting from this operation. The obstruction was evidently of the chronic type but apparently it was becoming complete.

On April 29, two days after the patient was first seen, an abdominal operation was done. Under ethylene anesthetic the peritoneal cavity was opened through the old scar. In doing so a loop of markedly distended bowel protruded through the wound. Intra-peritoneal examination revealed a mass in the ascending colon which had the feel of a circumscribed tumor. Further examination revealed that there was an intussusception of the ileum into the large bowel. The loop inside of the bowel was hard and felt like a neoplasm of some kind. A considerable portion of the ileum was reduced but one loop could not be freed. A resection of fourteen inches of small bowel, includ-



Artist's drawing of specimen removed at operation. Note intussusception of small bowel with tumor. The growth bulged completely through the bowel wall during the operation.

ing the mass, was done. About four inches of the ileum proximal to the ileocecal valve was left. This was turned in as a blind stump and a side-to-side anastomosis was made between the ileum proximal to the tumor and the cecum.

The patient made an uneventful recovery from the operation except for a mild wound infection. Now, fourteen days after her operation, she is sitting up and will be able to leave the hospital in a few days.

Intussusception in the adult is somewhat rare. In a monograph based on 400 cases collected from the London City Hospital by Perrin and Lindsay, the following figures are given: approximately 70 per cent of these intussusceptions occurred during the first twelve months of life; 10 per cent during the second twelve

months. In other words, 80 per cent of the cases of intussusception occur during the first two years of life, 15 per cent occur between the ages of two years and fourteen years, and 5 per cent occur after fourteen years.

Elliott and Corscaden analyzed 300 cases of intussusception in adults. They observe that 100 of these cases, or 33½ per cent, were due to tumors of the bowel. Out of this 100 cases, 40 of these tumors were malignant and 60 were benign. You will observe from the specimen that this intussusception was due to a tumor.

Microscopic section of this tumor shows the surface to be covered by a thin layer of epithelium, evidently a remnant of the mucous membrane. An occasional mucous gland is seen near the surface. The rest of the tumor consists of spindle-shaped cells with an abundant mucinous intercellular substance. The diagnosis is myxoma. There are no mitotic figures and no areas of rapid growth, so the histological interpretation is *benign myxoma*.

Tumors of this type do not recur when completely excised. However, they have a notable tendency to local infiltration.

DR. A. E. BENJAMIN (Minneapolis) reported the following case:

I wish to present a report of a case of unusually large encysted bladder calculi with enlarged prostate, hemorrhages and loss of weight.

The patient is a widower, retired farmer, 71 years of age, 5 feet 4¾ inches tall, and weighs 106 pounds. He has had very good health, with the exception of three attacks of pneumonia and rheumatism. He has had no injuries or operations. His family history is essentially negative.

About two years ago he began having pain through the bladder region, with dysuria, some frequency, and at times passed a good deal of blood, specially upon exertion. He had considerable gastrointestinal symptoms with extreme constipation, loss of appetite and weight, and he also complained of backache. Eight weeks ago he began having severe attacks of pain, with vomiting and difficulty in emptying the bladder. A diagnosis of cancer had been made.

The throat and tonsils were red, tongue slightly coated. His heart was dropped somewhat but there was no irregularity. The lungs were negative. He had a full lower abdomen with prolapse of the stomach and intestines, and a weak left inguinal ring. The prostate was considerably enlarged; he had a few hemorrhoids and moderate varicose veins of the legs. His blood pressure was 166/76, temperature 98.6°, pulse 80, respirations 20. He habitually had from 500 to 800 c.c. residual urine which contained a slight trace of albumin.

X-ray films of the pelvis and sound revealed two large stones in the bladder.

An operation was performed under spinal anesthesia. There was one stone 2¼" × 1¾" × 1¾" encysted back of the prostate and difficult to dislodge. The smaller stone 1¾" × 1¾" × 1¾" was lying over it.

The bladder was closed without drainage, and a retention catheter inserted.

His progress has been very satisfactory since the operation; there has been no leakage of urine through the incision. The patient was able to void after the third day when the catheter was removed. There has been no residual urine since the operation, his temperature is normal, and he has had no vomiting. He was out of bed on the fifth day.

The conclusions and interesting facts about this case are: the unusual size of the stones, one stone being almost completely encysted back of the prostate, the pronounced symptoms of gastrointestinal disturbance, the loss of blood and loss of weight, and the supposition by friends and a physician that a cancerous growth existed. The decision not to remove the prostate, although considerably enlarged, was reached as the residual urine and size of the prostate was thought probably due to the presence of the stones. The rapidity of progress after the operation, the lack of residual urine and the disappearance of all symptoms a few days after the operation were gratifying.

DR. FRANCIS F. CALLAHAN (Pokegama) read his thesis, entitled "Collapse Therapy in Pulmonary Tuberculosis," and showed slides of X-ray films of a number of cases.

DISCUSSIONS

DR. D. G. GARDINER (St. Paul) (by invitation): I have enjoyed Dr. Callahan's paper very much. Most of the phrenic nerve resections you have seen on the screen have been rather recent—in the last 3 or 4 years. Some of them speak for themselves. Looking at the slides in these cases is like looking at autopsies—one sees some of his good and bad results.

One thing Dr. Callahan mentioned in his paper but I do not think stressed sufficiently is the meticulous postoperative care necessary over such a long period of time. This consists in the application of very tight adhesive strapping to the whole affected side and renewing them, each time tighter, every few days. This can be augmented by sand or shot bags over the lesion to aid in compression. The good results one gets following thoracoplasty are attributable to the clinician who takes charge of the patient after operation. I also speak for Dr. Daugherty in this connection in his work at Ancker Hospital and Pokegama Sanatorium. A few years ago I remember seeing a patient who was operated for lung abscess. A classical two-stage thoracoplasty had been done by a general surgeon who was not familiar with the necessity for such postoperative care and except for the scar on his back one could hardly tell which side had been operated. His X-ray picture showed complete regeneration of ribs following thoracoplasty with full return of symptoms. The lesson to be drawn from these is that convalescence following thoracoplasty takes a period of months and tedious care.

I think many of the good results that any one gets after phrenic nerve evulsion should be credited to the clinician or the man in the sanatorium who gives the same care postoperatively to the patient that he does

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pre-operatively. The selection of these cases is a very difficult problem and the clinician sometimes picks cases which even with his very best judgment are not suitable for thoracoplasty but could tolerate a phrenicectomy and a long period of observation thereafter because phrenicectomy is in itself a simple operation with very little possibility of doing harm attached to it. I have had about 150 phrenic nerve evulsions and have not seen any complications from them. Many times they are only a test as to whether or not the patient can stand thoracoplasty, and in many instances they are sufficient to alleviate the symptoms, which really amounts to a cure.

Dr. Callahan mentioned the indications for thoracic collapse and for phrenic nerve evulsion, but of course the ideal type of phrenic nerve evulsion is the case with the basic lesion. Unfortunately tuberculosis does not always strike the base; it usually is an upper lobe lesion. In our cases at Ancker Hospital there have been 6 cases of upper lobe lesion which have closed following phrenicectomy but as yet we have not seen a suitably proven case of basal tuberculosis.

I think Dr. Callahan's review of the literature of this subject has been quite complete and think it speaks well for his conservative management and attention he has paid to the cases coming under his care and following the cases for a long time postoperatively, which I think is an important point.

DR. H. LONGSTREET TAYLOR (St. Paul): It seems hardly fair to go away from a subject as recent as this without going back to see how it has gradually evolved from the dark days of the 70's. In my own experience I can recall when we had no tubercle bacilli to look for, or at least we did not know we had them; we had no tuberculin to test with, no X-ray, and no collapse therapy. It is not so far back now since the evulsion of the phrenic nerve and thoracoplasty have come into use. In the olden times when families were particular about their insurance standing, the death certificates were nearly always "chronic bronchitis." That lasted until the examinations for tubercle bacilli came in.

Trudeau, in his Life, says that he picked Baldwin out as a scientist because he came to him saying that he had tuberculosis of the lungs. Trudeau asked him how he knew he had tuberculosis, and Baldwin replied, "Because I have demonstrated tubercle bacilli in my sputum." Trudeau took him in and put him at the head of the research department at Saranac Lake, where he still is. Few men would be called scientists today because they knew how to stain tubercle bacilli.

It is certainly very interesting to think of the changes which the last 50 years have brought in the treatment of tuberculosis and the increased possibilities for recovery that are offered to the patient by the armamentarium we have at the present time with which to handle this very serious disease.

ABSTRACT

Dr. Michelson reported on his studies over the past two years on the superficial lymphatics in early syphilis; and his conclusions were as follows:

1. One hundred and forty-five lymph nodes excised from patients with untreated syphilis were examined.
2. In approximately 27 per cent of the specimens, tubercloid structure was present.
3. The test with tuberculin, performed on 14 patients whose glands showed tubercloid structure, was positive seven times.
4. The luotest was negative when performed on 9 patients whose glands showed tubercloid structure.
5. Tubercloid reactions found in the lymphatics in early syphilis are variable in type, and apparently the state of allergy is not the same as when this reaction is found in the skin.
6. True gammas of the lymph nodes differ from the tubercloid structure found in the nodes in early syphilis.

DISCUSSION

DR. J. F. NOBLE (St. Paul) (by invitation): Those of us who are interested in general pathology are particularly grateful to Dr. Michelson for this and similar histologic studies which he has carried out on dermatologic problems. The general pathologist is lost when it comes to the diagnosis of skin diseases. These lesions, to him, are simple acute or chronic inflammatory processes and it requires special study such as Dr. Michelson has given the subject to be able to recognize the finer diagnostic changes.

The microscopic pictures which Dr. Michelson has shown this evening, are, as far as I can determine, indistinguishable from tuberculosis. Tuberculosis of the lymph nodes shows two types of histologic reaction, the caseating lesion and the proliferative tuberculous lymphadenitis. The gummatous lesions are not likely to be mistaken for tuberculosis.

With reference to the question of allergy, I think Dr. Michelson is correct in concluding that this type of inflammatory reaction is not characteristic of the allergic state. Rich, Clawson and others have definitely shown that allergic inflammation may vary in degree from a slight proliferative reaction to abscess formation.

Dr. Michelson's work also brings up the question of the function of the lymph nodes in this type of infection. His work seems to show that the lymph nodes attempt to localize the infection but clinical and experimental data point to the fact that the spirochete promptly passes lymph node filter and the infection becomes generalized.

DR. C. B. WRIGHT (Minneapolis): For my own information, I would like to ask Dr. Michelson how he excludes the possibility of tuberculosis in these cases. Tuberculosis is a very common disease and many of these cases may have tuberculosis in addition. How do you prove that this is not a tuberculous lesion?

DR. H. E. MICHELSON (Minneapolis) read a paper on "Studies on the Lymphatic Glands in Early Syphilis." Slides of pathological studies were shown.

DR. E. M. HAMMES (St. Paul): I would like to ask Dr. Michelson if these 28 per cent of cases of early

syphilis showing this reaction are more or less prone to develop central nervous syphilis later on in life.

DR. MICHELSON (in closing) said he would like to emphasize what Dr. Noble said about the action of the lymphatic glands. It was previously thought that these nodes acted as barriers, but the work of many investigators in experimental syphilis had shown that the adenitis was part of the general reaction to the infection and that spirochetes could be found in the blood stream and even in the spinal fluid before there was any demonstrable lymphadenitis.

In answer to Dr. Wright's question, the cases had all been passed upon by Dr. S. E. Sweitzer, and there was no question that clinical syphilis was present. Another strong point against tuberculosis was that when a patient had a bilateral adenitis which was clinically syphilis and a gland was removed from one side, and under anti-syphilitic treatment the adenitis subsided, it was a fair presumption that tuberculosis was not present, because colliquative tuberculosis occurring in lymphatic tissue is notoriously slow to respond to any treatment, and heals only after complete elimination of the focus. Stains for tubercle bacilli had been made and were always negative. Dr. Bell also emphasized the point that liquefaction had not been found in any of these specimens.

The question that Dr. Hammes asked is the very one we have put to ourselves: What significance has this finding in a prognostic way? I am sorry to say we are unable to answer.

R. T. LAVAKE, M.D., *Secretary.*

LIMITATION OF THE MANUFACTURE OF NARCOTIC DRUGS

In accordance with the provisions of the Hague convention of 1912, Congress made laws for controlling and regulating the production of and the traffic in the drugs mentioned by the convention. Now domestic production and traffic in these dangerous drugs is limited by federal law. The importation of opium and coca leaves into the United States is restricted. The enforcement of the laws have, however, not prevented the importation of drugs for illicit uses. Introduction of narcotic drugs by smugglers cannot be prevented until other countries control the manufacture and export of narcotic drugs adequately. To this end our government initiated the movement which resulted in the calling of the International Opium Commission at Shanghai in 1909 and since then has continued in its efforts along these lines. The manufacture of narcotic drugs must be limited to approximate medicinal and scientific needs. Physicians must aid in the determination of such needs by limiting their own prescribing to indispensable uses. The pitiful character of the drug addict and the association of drug addiction with crime and other menaces to the public welfare demand all the help that physicians can give in solving this problem. (Jour. A. M. A., May 9, 1931, p. 1623.)

PROCEEDINGS OF THE MINNEAPOLIS CLINICAL CLUB

Meeting of May 14, 1931

The regular monthly meeting of the Minneapolis Clinical Club was held on Thursday evening, May 14, 1931, in the Lounge of the Medical Arts Building. After dinner, the meeting was called to order by the President, Dr. F. H. K. Schaaf, at 7 p. m.

After a short business meeting in which amendments to the Constitution and By-Laws were voted upon, the following scientific program was given.

DR. R. T. LAVAKE read a paper entitled "Preëclamptic Toxemia of Pregnancy":

The aim of this paper is to stress a clinical observation that I believe to be of the greatest practical importance, namely, the increased likelihood of the accession of preëclamptic toxemia of pregnancy coincident with or as a sequel to any type of infection, focal or general.

This observation led me to espouse the infection theory of eclampsia in an article appearing in the October 15, 1916, number of the *Northwestern Journal-Lancet*. A continued study of this problem during the past fifteen years had convinced me that this observation is of the greatest practical importance from the standpoints of prophylaxis and preparedness. It directs the clearing up of all focal infection in teeth, tonsils, sinuses, etc., and when infection—focal or general—cannot be avoided, it directs increased care in looking for the earliest signs of preëclamptic toxemia. Although no one has been able to prove the infection theory, it is my belief that it will eventually be proved.

I feel that this paper is timely because I have just finished a review of obstetrical literature to date on the subject and have visited many outstanding clinics and find that it is generally held that the infection theory has been discarded as untenable from the results of investigation; and the clinical observation of the frequency of the accession of this toxemia upon any type of infection is not made and stressed.

As an example of the practical importance of giving this theory careful attention, let me cite one case among many. A woman normal in every way, whom I had delivered normally twice before, contracted in her seventh month of pregnancy what she designated as a cold. It was apparently so slight an infection that it did not confine her to bed though it lasted a week and she was quiet during that time according to her physician and herself. Three weeks later her urine was absolutely normal and her blood pressure was 120/60 and she said she felt in perfect condition. However, this history of infection put me on my guard and a week later being called up by her and questioned as to the best thing to take for a slight headache, I insisted that I go out to see her. She demurred at this, saying that she and her husband were all dressed to go out to dinner and that my seeing her was unnecessary. I insisted, however, and found her systolic pressure 240. We went to the hospital instead of to the dinner. Labor was in-

duced by bags and the case terminated well. She never had a convulsion but I felt that early and prompt attention should be given some credit in the result.

Let us use this case as an example for theoretic reasoning and permit me to describe how I believe infection brings about this condition. It must bring it about through its action upon the fetus or placenta and it is my belief from observation that it does so by producing alterations in the placenta, generally grossly signalized by infarctions, and that either autolysis of these infarctions causes the toxin, as brought out by Young of Edinburgh in 1914, or the alterations in the placenta permit of products being absorbed from the fetus that produce the lesions. The frequent pronounced improvement following intrauterine death of the fetus lends some weight to the latter theory.

Just because we do not know absolutely the cause of this toxemia, do not let us ignore the possible significance of the sequence of infection and toxemia. Especially, whether right or wrong, it can only act to increase our efficiency.

There are several stock arguments against the infection theory that I would like to mention because they immediately deter many men from thinking further about it. One is: Nearly everyone during pregnancy will have either some focal infection or some general infection, however slight. Why do not more women have preëclampsic toxemia? One may say the same for rheumatic fever. Has any one yet solved the problem of why one will have joint involvement with a tooth or tonsil infection, and another not? A parallel situation may apply to alteration in the placenta.

Another argument is: The large majority of placenta show some infarction and yet only a small percentage develop toxemia. True, but one must consider that the accession of toxemia depends upon the inability of the excretory organs to take care of the toxin, whatever it may be; and again, from my knowledge of the formation of the placenta, where every cell likely obtains one-half of its proteins from the male side, no two placenta would be alike in their toxicity to that particular mother.

Another argument is that there is no evidence that infarcts are even the results of infection. They may be just an evidence of an aging organ or the abnormal alteration in a rapidly growing organ. I can merely say that practically every placenta from patients miscarrying or having premature labor in the great Flu epidemic were filled with infarcts. This phenomenon occurs in miscarriages during every general infection. Careful gross observation of placenta in general infection directs attention to the likelihood of placental alteration due to the infection. Otherwise why should these placenta show such tremendous infarction compared with placenta from normal cases.

Preëclampsic toxemias also show a greater average infarction. Some of them, when not showing infarction, show local areas of color change that suggest a likely alteration. Whether or not these areas are the beginnings of infarction, I am not prepared to state.

Conclusion.—No theory of preëclampsic toxemia is of greater practical value than the infection theory. Keep

it in mind for practical as well as experimental purposes until it can be absolutely disproved.

DISCUSSION

DR. F. H. K. SCHAAF: Of course, the relation of focal infection to systemic disease is always going to be very much debated, and, while we may suspect it as a factor from a clinical standpoint, it will be difficult to prove our views from a pathological standpoint. This is true not only in preëclampsic toxemia but also in myocardial degeneration. Pathologists at the present time do not admit that focal infection can be a factor but at the same time we see many cases of myocardial degeneration where it is utterly impossible to find any other etiology. I fear there always will be arguments pro and con.

DR. H. B. DORNBLASER: I think this paper is very timely. I enjoyed it very much. On looking through my own records of preëclampsic toxemia, with the idea in mind of an infection as the cause, while not all of the cases had a note to the effect that the patient was suffering from infection, my recollection of some of them was that there had been some focus of infection present—a sinus, bad tooth, or something of the sort. When one looks at these cases with the idea of infection in mind, he often finds it is there although it did not seem to be a very big factor at the time. I think it is something obstetricians will have to watch carefully, and the essayist is to be congratulated on his prompt action in seeing the patient who complained of severe headache.

DR. F. W. WITTICH read a paper on "Indications for Therapeutic Abortion in Tuberculosis."

ABSTRACT

The influence of pregnancy on the tuberculous woman was noted in the early centuries. Statistics of various writers are noted showing that pregnancy is one of the leading factors in lighting up an inactive process—that in 30 to 40 per cent of married women pregnancy was responsible for lighting up an inactive process and that the disease proved fatal in about 30 per cent. The death rate is higher, the closer the period between the disease and the pregnancy and the more advanced the disease. Tuberculous women having sanatorium training do not become pregnant as often as normal women. Postpartum hemorrhages occurred in a very large proportion of the tuberculous women.

No bad effects were noted after 80 artificial abortions noted among the discharged Trudeau Sanatorium cases reported by Matthews and Bryant, and a few onsets and recurrences occurred after some of the 101 spontaneous abortions noted by them. Of their series 71 per cent of those who bore living children nursed their babies in spite of the general teaching against nursing by tuberculous women.

The writer studied a group of 515 definitely active cases of tuberculosis among women of all ages and stages of the disease from his private files between the years 1917 and 1931. One hundred seventy-eight gave histories of having one child or more, of which 95 are living and 83 are dead. Of 337 who gave a history of never having been pregnant, 169 are living and 168 are

dead. Very little difference was noted between the number of deaths between the maternal and non-maternal group, although this is influenced by the fact that among this series were a comparatively large number of young women between the ages of 15 and 25 years who were never pregnant and who had rather an acute advanced stage at the first examination, where the disease was advanced beyond the stage where collapse therapy could be done, whereas the older maternal group presented more of the fibroid type more limited in extent and where artificial pneumothorax played an important factor in prolonging life. There were 23 induced abortions in the entire series, five of whom are dead, 16 living, and two untraced.

Abortions should be decided upon before the third month, or as early as possible, and never later than the fifth month. The active early cases are the most suitable and the moderately advanced less so. In cases complicated by hyperemesis or laryngeal tuberculosis, abortion should be done in the early months. Artificial abortion should never be done on a tuberculous suspect and collapse therapy in some form should be considered in all cases. The acuteness and rapidity of spread of the disease should be considered, as abortion influences cases with a rapid recent spread very little. Artificial abortion should not be done in any case unless the patient can have excellent care and undergo the strictest and accepted anti-tuberculosis measures, preferably in a sanatorium.

As the indications for such a procedure become more complicated where the symptoms, physical signs, X-ray, and knowledge of collapse therapy play an important role, it should be required of every tuberculous pregnant woman to have the benefit of the roentgenologist and the internist versed in the special therapeutics of tuberculosis, as well as the obstetrician. A thorough chest examination and, if possible, X-rays should be taken of every prospective mother as a routine prenatal procedure.

DISCUSSION

DR. R. T. LAVAKE: This is a very timely paper. It has always seemed to me, in this question of tuberculosis and pregnancy, that the whole thing from beginning to end hinges on the questions: the perfection of sanatorium or sanatorium-like treatment, how much you can protect the patient from work at the time of labor, and how well you can keep the affected lung immobilized. I haven't had experience with phrenicotomy, but that seems to offer the best solution to this problem. I have never seen a case where pregnancy seemed to interfere with the well-being of the woman; in fact, it has always seemed to me she has felt better from the pregnancy, after the first three months, than she had ever felt before. The circulation of the extremities is bettered as a rule. I believe that pregnancy improves the general well-being of a woman. The same applies to the tuberculous woman, but the danger lies after delivery when you change the position of the diaphragm, which is practically in the position that it is after phrenicotomy; it is suddenly allowed to come down and that just shoots the tubercle bacilli through the lungs. The

reason, in my opinion, why abortion should be performed before three months have elapsed is because there has been no disturbance of the diaphragm and no muscles have been brought into play. These patients do loose a little blood, but often this is not in excess. Personally, I believe that a woman who has had active tuberculosis within two years, if seen within the first three months, should be advised to have the pregnancy terminated. Of course the religious factor and her own desires must be taken into consideration. If she goes to delivery I think she should have a phrenicotomy or a pneumothorax, and one can do a cesarean under local if necessary to prevent all effort. The vital capacity of the lungs is the same at the time of delivery but the lungs are flattened from above downward. As soon as the pregnancy is ended, the diaphragm falls and the lungs resume their normal shape. I think that a phrenicotomy or a pneumothorax is advisable. I have not used them, but have always advised putting a pillow over the uterus after delivery, thus attempting to hold the diaphragm up. I believe that if we could absolutely prohibit the change in the diaphragm or the mechanics of the lung, the woman should have no trouble at all. She should, however, be at a sanatorium and under the best care.

DR. H. B. DORNBLASER: I was very much interested a week or so ago in attending a meeting at Glen Lake Sanatorium in which Dr. Jennings reported their statistics for the last ten years on 35 cases of pregnancy in the tuberculous patient. At first they picked them very sparingly, but have come to the conclusion that they can carry nearly any with tuberculosis through a pregnancy. His statistics in the early cases were about the same, whether the case was aborted or allowed to go to term. They felt they had not gained much by aborting them early. The majority of the women they have taken through their pregnancies, and their tuberculosis was in no way advanced. They do suggest, however, that the woman should be given as easy a labor as possible, and should have the best possible care for the tuberculous patient afterwards, i.e., should be in bed for at least three months and go on a cure, and also that the baby should not nurse. I have a patient now who has an active tuberculosis and insists on going through her pregnancy. When I first saw her I thought it was suicidal to do it. She had been a patient at Glen Lake. She says that as soon as the delivery is over she will take a cure either at home or go to Glen Lake.

DR. F. H. K. SCHAAF: It seems to me that we have to consider each case individually and make a decision accordingly. Firm and fixed rules cannot be formulated for any therapeutic procedure.

DR. LAVAKE: In the case Dr. Dornblaser just mentioned, if I may offer a suggestion, when that woman delivers I certainly think she should have a pneumothorax or phrenicotomy or she may not get to the sanatorium after delivery. When that diaphragm comes down it is too late, but with either of these procedures there is less chance of that happening. I have seen cases, apparently well at an easy delivery, cough up a teacupful of pus filled with tubercle bacilli a few days

later and die within a few weeks. I don't think that would occur now with the means at hand for lung immobilization.

DR. J. M. HAYES: I would like to ask if Dr. Dornblaser's case is bilateral tuberculosis?

DR. DORNBLASER: Yes.

DR. E. S. PLATOU: Are all cases of pulmonary tuberculosis with pregnancy suitable for immobilization and when is the optimum time for such immobilization?

DR. R. C. WEBB: Are there any objections to phrenicotomy, or would it be preferable to crush the phrenic nerve and let it recover at a later date?

DR. WITTICH: I think, but am not positive, that Dr. Kinsella just crushed the nerve in some of his earlier cases, but I do not see why it should not be pulled out to get as much fixation of the diaphragm as possible.

DR. WEBB: Then you don't do phrenicotomy as a prophylactic measure; but should it have been done before?

DR. WITTICH: It should have been done previously perhaps if the disease had been detected before the pregnancy where this procedure is indicated, but the pregnancy may be the only indication for phrenic exeresis. It is rather difficult to get the patient's consent sometimes, and then again many physicians are not familiar enough with the procedure or realize its importance in these cases. Personally, I prefer to do pneumothorax if possible, taking the side having the most disease, when the lung can be allowed to re-expand if results are not obtained, or there is increased activity in the opposite lung. Phrenic exeresis is a permanent thing and this may not always be desirable.

DR. E. T. EVANS: On the other hand you have had a period of four months in which it was doing some good.

DR. WEBB: If phrenicotomy is better why would you even consider pneumothorax unless you had some objection to phrenicotomy?

DR. WITTICH: Pneumothorax has always seemed a simple procedure to me. Besides a phrenicotomy produces far from the satisfactory collapse that a pneumothorax will give; the former, however, is certainly a most valuable procedure when indicated.

DR. LAVAKE: It would seem to me that phrenicotomy would be better, then you could do a cesarean, and I do not think it would hurt the woman at all.

DR. WEBB: I think some years ago Dr. Wittich read a paper on the relation of vital capacity to post-operative risk. Can a patient hold the breath as long after phrenicotomy as before?

DR. WITTICH: No, but the vital capacity gradually approaches its former level.

DR. WEBB: Then you would prefer pneumothorax because the lung comes back afterwards, while with phrenicotomy you have lost the action of the diaphragm?

DR. LAVAKE: One thing which has not been brought out and which seems to be a very wise thing, and that is that every patient who has had tuberculosis within two years the patient should be given advice not to

become pregnant until the lesion is entirely gone. I do not believe they get such advice.

DR. PLATOU: It is true that some women never suspect they have had tuberculosis and after having a baby break down with rapidly progressive tuberculosis.

DR. LAVAKE: I think Dr. Wittich mentioned there were about 33 per cent.

DR. PLATOU: Don't you think that is a good argument for a very careful study of the patient who becomes pregnant, with at least one routine chest plate during her course?

DR. LAVAKE: I am of the opinion that that diaphragm must never move once. One case was very interesting to me. This woman had aborted twice by herself. I think every woman who has aborted should be gone over by an internist to find out if she has a focal infection. The third time she did not abort. She was a patient of Dr. Bell and we went over her very carefully and then advised abortion. She refused, went out to Colorado, and died three weeks after delivery.

DR. F. W. WITTICH reported the following case and showed the two complete specimens of *diphylobothrium latum* or fish tapeworm. These specimens were passed by a native born Jewish woman 65 years of age after vigorous anthelmintic treatment. She had had a moderate diabetes mellitus for about five years and four years ago entered the hospital, where she underwent treatment for worms, but the physician failed to get the heads. There were little or no symptoms. She presented a moderate secondary anemia. Attention is here called to Dr. Moses Barron's excellent paper in the *Journal of the American Medical Association* of May 11, 1929, reporting 19 cases among native born Americans, four of whom were his own cases. He calls attention to the fact that the majority are Jewish, and mostly women, who are accustomed to tasting from time to time, for proper seasoning, the raw minced fish while preparing the commonly used Jewish dish of "gefüllte fish." The woman gave this history. She had frequently tasted the raw minced fish in the preparation of this fish.

The one specimen shown is 18 feet long and the other seven feet long. These worms are often eight meters in length. Attention is called to the lateral slit in the head and to the split tails. It is noted that, besides man, the dog, cat and fox have been found to be infested; that there are two intermediary hosts: the first larval stage developing in infested crustaceans from ova discharged in the stools, and the second larval stage in the body of the fish from ingesting infected cyclops, or from eating infected young fish.

Magath and others have shown that some of the northern lakes of Minnesota are heavily infested, especially the pike and pickerel. The larval worms are also seen in carp.

The treatment in this case was as follows: For three days before entering the hospital, the patient ate lightly of milk, milk toast, cereals, broth and coffee. On each of these days she was given a tablespoonful of a solution of Epsom salts containing spirits of chloroform 15 c.c. and 60 grams of magnesium sulphate to 200 c.c.

of water, three times daily before meals. The night before entering the hospital a double dose of the salts mixture was given and a soap and water cleansing enema, and the patient took no food and but little liquid. The patient entered the hospital before 9 o'clock the next morning, when four 0.5 gm. capsules of oleoresin aspidium was given. This dose was repeated at 10 o'clock. The capsules were uncapped before giving. At 12 o'clock 3 tablespoonfuls of the salts mixture was given to prevent absorption of the male fern.

The patient remained in bed the entire day, taking only some black coffee and a little bouillon during the morning. In the afternoon the patient was given a light diet. All specimens were carefully searched by straining through gauze, and a final high cleansing enema was given that night.

H. BRIGHT DORNBLASER, M.D.,
Secretary.

"DISEASED" BUILDINGS

Several articles have appeared recently in medical journals calling attention to inaccuracies often noted in scientific terminology, or nomenclature, not only in secular periodicals and newspapers but in technical bulletins as well.

A well known tuberculosis laboratory has issued a circular announcing that a "Tubercular Building" for children was to be erected. This is a misnomer commonly used even among medical workers. Those who know have repeatedly pointed out that a diseased organ may be "tubercular," but the patient is "tuberculous." It is to be hoped that the building in question will not suffer from this type of organic condition, at any rate not for some years to come.

In the field of mental hygiene it has been necessary to explain to the uninitiated the difference between "mental defect" and "mental disease." But we too have been careless with our psychiatric vocabulary. Why the "Psychopathic Hospital"? There may be "psychopathic social workers" but state hospitals and mental hygiene clinics try as far as possible to employ safe and sane "psychiatric" social workers. Facetiously, and for the sake of brevity, professional workers have referred to students of mental deficiency as the "feeble-minded group."

"Insane" is a good old fashioned word, try as we might to discard it as a medical term, but why announce, as does a current bulletin, that the foundations have been completed for two "disturbed buildings" and two "epileptic buildings" for the blank "insane hospital"? Have you ever seen a "nervous hospital"? But even the purist is stumped at "mental institutions," the phrase has come into such general use. The technologists have given us the televox, the electric man and the robot, but it takes a psychiatrist to endow a hospital for the insane with mind.—*National Committee for Mental Hygiene.*

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

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Minneapolis, Minnesota

EYE, EAR, NOSE AND THROAT

CHOLESTEATOMA: Alexander Retjo (Arch. Otolaryng., May, 1931, Vol. 13, p. 709). Microscopic examination of material from the suspected case and the roentgen ray do not give useful information in a large percentage of cases. Virchow brought out the fact that cholesterol is not peculiar to the cholesteatoma masses, since it is found in many other parts of the body. The cholesterol content of these epithelial masses is exceedingly inconstant and varied (Luce). Salkowski's investigations showed that although there is always cholesterol in the cholesteatoma, it may be in an amorphous state instead of in the crystalline form. Crystalline cholesterol is an alcohol of high valence; the amorphous cholesterol is its ester. Lautenschlager demonstrated that the agent that destroys the bone is the

chemical effect of cholesterol and not the mechanical pressure of the tumor as was formerly believed.

According to Salkowski's estimate, there is 10.6 per cent cholesterol that is cholesterol ester in the normal epidermis and 18 to 23 per cent in the cholesteatoma of the middle ear. The content of cholesterol found in the normal epidermis may be doubled in pathological conditions. As to the causes and conditions that produce this variation, it is known that epidermis normally grows in dry surroundings, that is, in contact with air, but becomes degenerated and changes to matrix in the presence of moisture when air is absent and in a dark place. The author, observing the deleterious effect of aqueous solutions on the effort of nature to epidermatize a deep aural space, sought a substance capable of drying and also of dissolving cholesteatomatous masses. He is now using carbon tetrachloride for this purpose.

For the chemical demonstration of cholesteatoma, the author has applied Bloor's method to the examination of the barbon tetrachloride extract and devised a colorimeter for index of the quantity of cholesteatomatous material. The author hopes that others will apply his method so that larger series will be reported.

LAWRENCE R. BOIES.

SINUSITIS IN CHILDREN: Henry A. Riesman. (*Archiv. Ped.*, May, 1931, Vol. XLVIII, Page 283). In climates similar to that of New York City, sinusitis is a disease fast becoming a problem of paramount importance, because of its increasing prevalence, the difficulties in diagnosis, the resistance of sinusitis to treatment, and its complications and sequelae. Marriot is quoted, who stated that more than one-half of the children in hospital wards are under treatment for some form of paranasal sinus infection regardless of the diagnosis on admission.

Two diagnostic signs additional to those commonly sought for are emphasized: the enlargement of retropharyngeal glands apparent directly behind the posterior tonsillar pillars, and the elicitation of submaxillary tenderness at the midline of the body of the mandible.

The author has found, in a comparatively large number of cases, secondary pulmonary infection resulting from a primary sinusitis to involve the central lung field, and to present a picture so similar as to be at times very confusing with that of juvenile tuberculosis.

The relationship between avitaminosis and accessory nasal sinus infection must be an indirect one, probably due to the lowered resistance of the cells of the upper air passages to infection. If this were not so, then our diet treatment for sinusitis, rich in all the vitamins, would be either specific or at least more successful, which is not the case. There is no doubt, however, that a diet rich in fat is beneficial.

The difficulty of X-raying children and the short duration of the infection may be factors in obtaining negative findings in the presence of positive clinical evidence corroborated by nose and throat consultation.

The author believes, despite contradictory opinions regarding the use of vaccines, that if the vaccine is au-

togenous and properly prepared and given, a greater resistance to nose and throat infections is developed. Though it may be temporary, the treatment is justified. Details of the author's method of preparation and administration of the vaccine are given. He recommends a diet high in fat and protein and comparatively low in carbohydrate—essentially the diet used in tuberculosis. Alpine therapy is considered to be of minor value. Rest and the prevention of over-fatigue are important.

LAWRENCE R. BOIES.

THE PROGNOSTIC VALUE OF EXAMINATION OF THE BLOOD IN OTOLGY. Arthur Weiss (*Arch. Otolaryng.*, May, 1931, Vol. 13, Page 647). Weiss reports a study of the leukocytes in acute otologic infections, evaluating the usefulness of interpreting the differential study according to the method of Schilling. To quote the author: "The physician of yesterday, depending on the number of leukocytes and the percentage of polymorphonuclears for his information in cases of severe infections, often found himself unable to explain apparently contradictory relationships. With the appearance of the work of Arneth and Schilling, this apparently false relationship was clarified and explained. Today, while the actual number of leukocytes is of but casual importance, the number of immature neutrophils or staff cells has achieved the center of the stage."

The author has found that for matters of diagnosis, inconsistencies exist in the reactions called forth by the various types of disease, and therefore the immature count is not of particular use as an aid to diagnosis. For instance, a case of acute otitis media purulenta, which usually precedes the infection of the mastoid, may give a more active response than the latter. This, Weiss explains by suggesting that infection of the middle ear and sinus often result in a severe systemic involvement, whereas infection of the mastoid, usually only a localizing or pointing of the otitic inflammation, causes few if any symptoms and either gives normal figures in examination of the blood or shows evidence of slight stimulation.

His conclusions emphasize the following:

1. A rise in the percentage of staff cells indicates the presence of some postoperative complication, though the complication may not be in the postoperative area.
2. The leukocyte and staff counts are often much higher in acute otitis media purulenta than in acute mastoiditis.
3. All cases of mastoiditis with venous complications show marked changes in the blood picture.
4. The blood count when used in series is of inestimable importance in prognosis.

(Comment: In a paper on the same subject in the February Archives of Otolaryngology, I brought out the fact that the immature count reflects the intensity of the toxemia. Whether the toxemia results from otitis media alone, or from mastoiditis or a complication, there are factors both anatomical and bacteriological in the course of the suppurative process which influence the degree of toxemia. The immature count is an aid to diagnosis to the extent of information as to

the balance between invasion and resistance, in some instances of which the usual manifestations are not prominent.)

LAWRENCE R. BOIES.

MEDICINE

TUBERCULOSIS ABSTRACTS*

The Twenty-seventh Annual Meeting of the National Tuberculosis Association, held at Syracuse, New York, May 11-14, 1931, was attended by 1,010 registrants. Papers and discussions dealing with the pathological, clinical, social, and administrative aspects of tuberculosis furnished a well balanced program. While most of the papers were of interest primarily to specialist groups, all contributed to our general knowledge of tuberculosis. All papers, either in their entirety or as comprehensive abstracts, will be published a few months hence in "Transactions of the National Tuberculosis Association." A few high lights of general interest are here presented.

TUBERCULOSIS WORKERS REPORT PROGRESS AT ANNUAL MEETING

The opening session celebrated the twenty-fifth anniversary of the Christmas seal, the device which made possible the financing of the tuberculosis movement in the United States. Miss Emily P. Bissell, who introduced the seal in this country, was the guest of honor.

Dr. Livingston Farrand, president of Cornell University, who served as executive secretary of the National Tuberculosis Association from 1905 to 1914, described how the Christmas seal sale grew from \$3,000 in 1910 to \$5,350,000 in 1930. The total receipts from this method of fund raising in the United States have aggregated \$58,640,000. This money has been used largely for the promotion of official measures designed to combat tuberculosis, and by this means there have been secured from the public purse sums that aggregate at the present time close to \$500,000,000. "Christmas seals invested in community organization have resulted in dividends of incalculable benefit."

Emily P. Bissell recounted the origin of the Christmas seal. She was interested in 1907 in raising a few hundred dollars to provide a small sanatorium of 8 beds for consumptives in Wilmington, Delaware. Having read Jacob Riis' description of the Danish Christmas seal in "The Outlook," she decided to adopt the method. The first seal issued aroused scant interest until "The Philadelphia North American" gave it publicity and proved the possibilities of raising money through the sale of penny stickers. The seal was not a sudden inspiration or a detached idea. As a social worker, Miss Bissell had learned that fairly large subscriptions may be obtained for a worthy project from a few individuals if it is explained to them. But the real public, the people who can afford to give from ten cents to one dollar, are difficult to reach. The Christmas seal makes it possible for all to participate and also enlists wide-

spread individual interest in the problem of tuberculosis.

MEDICAL RESEARCH

Dr. Florence R. Sabin outlined the program of the Committee on Medical Research under the chairmanship of Dr. William Charles White. Under the plan, various universities and laboratories throughout the country coöperate in the solution of carefully outlined problems. All the groups engaged in the work meet frequently and discuss their progress.

One of the projects is that of subjecting strains of acid-fast bacilli, of which the tubercle bacillus is one, to chemical analysis. The essential foundation for such a survey is a synthetic culture medium of known and constant composition free from any protein, complex carbohydrates, and lipoids. The various products of the medium, as well as the chemical fractions of the tubercle bacillus, are submitted to biological tests in order to determine the specific physiological reaction of each fraction or pure substance. For example, saturated fatty acids derived from the tubercle bacillus reproduce typical tubercles in animals. Both proteins and carbohydrates derived from the tubercle bacillus reproduce the toxic symptoms characteristic of the disease. After each new fraction of the tubercle bacillus is isolated, it is tested in the biological laboratory, the end in view being to formulate a complete catalogue of the component parts and their physiological reactions.

Other studies include an investigation into the physiology, particularly the respiration rate, of living tubercle bacilli. One worker has devised a means of isolating a single bacillus and watching its entire life cycle under the microscope. Another group is attempting to standardize the reading of X-ray plates and the construction of X-ray equipment.

NEW DISCOVERIES ANNOUNCED

At the meeting of the American Sanatorium Association, one of the affiliated groups, several important research developments were announced. Dr. E. Fenger of Glen Lake Sanatorium, Minnesota, speaking for the group who participated with him, reported on a new tuberculin known as MA-100. This is a protein common to all acid-fast bacilli. The combined results of several investigators justified the opinion that the new tuberculin possesses four distinct advantages: (1) it is free from all substances that might render the positive reaction uncertain; (2) it can always be produced at the same iso-electric point in precipitation; (3) it contains nothing except what is manufactured by the germ of tuberculosis itself; (4) it can be diluted in quantity accurately to enable every physician to know exactly how much of the active element he is using.

Professor Charles Weyl of the University of Pennsylvania, technical adviser of a group headed by Dr. F. Maurice McPhedran who are endeavoring to standardize X-ray equipment, announced a method of making X-ray pictures of the chest so synchronized as to take several short exposures between heart beats. The resulting composite negative produces a clear picture free from blurring caused by the heart's action. Professor Weyl compared the mechanism of the apparatus with

*Reprinted from Tuberculosis Abstracts, a review for physicians, issued monthly by the National Tuberculosis Association. August, 1931, Vol. IV, No. 8.

that used in a combat airplane, whereby machine gun bullets may be shot between the whirring propeller blades. The device marks a step in advance towards standardizing X-ray pictures.

Another advance in the work with the X-ray was made public at the meeting by the same group, who have been attempting for several years to eliminate variations in the results obtained with different X-ray machines. Differences in lighting and mechanical action of apparatuses heretofore have made the accurate reading of negatives depend upon due allowances for peculiarities known to exist in the operation of the individual machine. For example, pictures made in one city with a certain apparatus would be found, if the patient moved to another city, to be of little use in diagnosing progress of tuberculosis because the second physician would not be conversant with the variables characteristic of the first machine.

By means of an instrument called a "comparator densitometer," designed and constructed by the group making the report, a standard is established which the operator can use to know in advance of taking the X-ray that a certain established density in the picture will be obtained. This enables physicians in different parts of the country to work with X-rays upon a uniform basis, as well as reducing the variations that have stood in the way of accurate judgment.

In addition to these developments, it was announced at the meeting that a fixed resistor has been designed which will test the supply of electrical current; also a peak voltmeter for vacuum tubes, and a standard testing apparatus which will help hospitals, sanatoria, and laboratories to choose the X-ray machine best suited to their needs.

EXPANSION OF TUBERCULOSIS ASSOCIATIONS

Harry L. Hopkins, director of the New York Tuberculosis and Health Association, discussed the question, "Should the Tuberculosis Association Go into Other Health Fields?" The rapid decline of the tuberculosis death rate and the wide increase of public facilities, such as sanatoria, clinics, health departments, and nurses, warrant the tuberculosis associations in giving serious thought to future programs. The campaign against tuberculosis has by no means been won; an aggressive warfare must be continued, but it should no longer be in the form of direct services rendered. Rather should it be to encourage public authorities to provide funds for adequate sanatorium beds, more tuberculosis clinics, more nurses, and more tuberculosis physicians. Its direct services should be limited to health education, and even here more efforts should be made to induce the public authorities to extend their own facilities. Associations can properly take part in direct activities of a research nature and more particularly those that are demonstrations in character.

Tuberculosis associations, national, state, and local, are admirably equipped to extend their efforts in combating other forms of disease and in promoting positive public health work. Among the projects that have already been undertaken by certain associations are the campaigns against diphtheria and heart disease, the

promotion of mental hygiene, child health work, and social hygiene.

OFFICERS ELECTED

The officers of the National Tuberculosis Association elected for the ensuing year are: president, Dr. Alfred Henry, Indianapolis; vice-presidents, Dr. John H. Peck, Des Moines, and Dr. Willard B. Soper, West Haven Connecticut; secretary, Dr. Charles J. Hatfield, Philadelphia; treasurer, Henry B. Platt, New York City. Officers of the American Sanatorium Association, whose sessions were held simultaneously, are: president, Dr. Harry Lee Barnes, Wallum Lake, Rhode Island; vice-president, Dr. Fred H. Heise, Trudeau, New York; secretary, Dr. W. H. Ordway, Mt. McGregor, New York.

The Trudeau Medal "for the most meritorious contribution on the cause, prevention or treatment of tuberculosis" was awarded this year to Dr. Allen K. Krause.

THE RELATION BETWEEN ALLERGY AND IMMUNITY IN TUBERCULOSIS: Max Pinner (*Amer. Rev. of Tuberc.*, 1931, XXIII, 174). The relation between allergy and immunity is the subject of many experimental and clinical studies. The term "immunity" is used by different writers with a disconcerting variety of meanings. Pinner defines it as "a condition which is in a specific way subservient to the existence of the biological entity whose integrity is attacked by a specific agent."

The following questions should be answered: is allergy desirable or not? is it instrumental in warding off infection? does it mitigate the destructive effects of reinfection? does it promote healing processes?

Fibrosis seems to occur only in allergic soil. The great frequency of healing and completely healed foci should be pointed out. "Fixation" of bacilli is instrumental in tuberculo-immunity. On the other hand only an allergic animal can be killed within a brief time by an infection with tubercle bacilli. Only in allergic soil does an infection cause acute and toxic conditions of exudative foci with rapid caseation. Whether fibrosis develops more rapidly with a high degree of allergy is not settled. Both healing and progression may proceed under the same condition of allergy. The attempt has been made to establish a quantitative relation between a phenomenon defined by its causation (allergy) and one defined by its purposive (teleological) significance (immunity). The one cannot logically go hand in hand with the other. It then cannot be decided whether immunity or hypersusceptibility is by necessity linked with allergy. It is impossible to establish a causal relation between them. Immunity depends not only on the condition of the organism in question but on extrinsic factors as well, such as dosage and virulence of the infecting micro-organisms, portal of entry, etc.

It is not permissible to ascribe all healing processes to specific immunity, for constitutional factors, environmental influences, mechanical conditions in the local lesion, and many more factors decide the clinical course.

The attempt to correlate allergy and immunity quan-

titatively is doomed to failure because the two are incomparable concepts. Immunity cannot be measured in terms of allergy for the same reason. The clinician should not try to correlate a strong tuberculin reaction with high immunity, nor will he find the reverse relation to hold true. The elusive nature of immunity, whose doings are obscured by many extrinsic factors, cannot be recognized nor measured until the disease has run its course.

The elimination of the term immunity from clinical usage will more clearly show the pressing need to study carefully the influence which allergy has on pathological processes. It should be possible by close clinical observation to decide definitely whether a high or a low degree of allergy influences favorably, resorption, fibrosis or calcification. The fact that the answers to such questions are not available today deprives us of the opportunity to use one possibly powerful weapon against the disease, namely, the controlled alteration of the intensity of the allergic state.

A. T. LAIRD, M.D.

PEDIATRICS

THE MORO REFLEX AS A DIAGNOSTIC AID IN FRACTURE OF THE CLAVICLE IN THE NEW-BORN INFANT: Heyworth N. Sanford, M.D., Chicago (*Amer. Jour. Dis. Children*, June, 1931, Volume 41, Number 6). Fracture of the clavicle in the newborn infant is the most frequent fracture occurring during delivery. Statistics show that this fracture occurs in one per cent of all births. It may result from manipulation during delivery, but it is by no means rare in spontaneous birth, especially when the mother is a multipara.

Moro found that on placing an infant on a table and then forcibly striking the table on either side of the child, a motor reaction is obtained. The arms are suddenly thrown out in an embrace attitude, describing an arc and tending to approach one another with a slight tremor; the fingers are at first spread and then closed. Gordon in examining eighty-five infants during the first month of life found that all gave a positive Moro reflex. He thought that the absence of the embrace reflex on one side is an indication of either motor paralysis or injury on that side.

There are several conditions in which this reflex is absent symmetrically for various periods of time during the first ten days, but the author has not seen any cases in which it was asymmetrical for more than the first twenty-four hours, except in fracture of the clavicle. On the side of fracture there is no response.

In 465 new-born infants, six cases of fracture of the clavicle occurred. This was the only condition in which the Moro reflex was asymmetrical, no reflex being obtained on the side of the fracture.

R. N. ANDREWS, M.D.

APPENDICITIS IN CHILDREN: R. Franklin Carter, M.D., New York (*Arch. of Ped.*, Vol. XLVIII, No. 6, June, 1931). The high mortality of acute ap-

pendicitis in childhood should be an incentive for a closer scrutiny of those patients who present symptoms of abdominal distress that may be the forerunner of the usual symptom-complex of acute appendicitis.

Primarily then, a consideration of the anatomy of the organ should be taken up. And it will be found to be a vestigial structure, subject to great variation in size, length, position, and in its relation to the ileum and cecum. The meso-appendix, in which the artery from the ileocolic vessel descends to supply the appendix, is also subject to great variation in length by which both the artery and the appendix may be affected in that the appendix may be thrown into coils or angulated at its base in case of a short mesentery and the return flow of blood hampered from pressure of the constricted vessels.

From a consideration of the anatomical peculiarities of this organ it will be seen that the stage is set for the primary step in the development of the acute appendicitis, viz., constriction of the lumen of the appendix. In view of the amount of lymphoid tissue in the appendix, any irritation is likely to cause a constriction from hypertrophy of its lymphoid tissue.

The associated nausea and vomiting of an appendicitis in the chronic stage is usually referable to eating. Frequently nausea or vomiting occurs during or immediately after eating and rarely do they occur definitely with the occurrence of the pain. It all is the result of a pylorospasm, which is a reflex from the intermittent appendicular irritation.

In the usual uncomplicated case of appendicitis, the further examination consists in a complete urinalysis, to further eliminate the kidney as a source; a complete blood count with eosinophilia determination; and a gastro-intestinal X-ray.

In addition to the acute appendices that result from the above process, there is a definite group of fulminating appendicitis cases, usually of the streptococcus type, that occur without prodromal symptoms and in which at operation the appendix may be found to have none of the developmental astigmata associated with the more common appendicitis that this paper deals with

R. N. ANDREWS, M.D.

THE MECHANISM OF THE KETOGENIC DIET IN EPILEPSY: E. M. Bridge and L. V. Tob (*Bull. Johns Hopkins Hosp.*, XLVIII, 373, June, 1931): In order to test the hypothesis that improvement from the ketogenic diet parallels the tendency to remove fluid stores from the body, Bridge and Tob studied three pairs of girls subject to frequent attacks of petit mal. As a result of these studies they arrived at the following conclusions:

"Neither the ketosis nor the acidosis accompanying the so-called ketogenic treatments for epilepsy can be considered the sole beneficial factor of such regimes.

"Experiments are reported showing that if the high fat diet has succeeded in removing a surplus of extracellular fluid from the body, improvement in seizures is associated; if the diet has not removed this fluid, it has not affected the course of the disease.

"Since a simple acidosis and a sodium-free diet also tend to produce similar losses of fluid from the body, fasting may be considered a triple mechanism—high fat diet, sodium-free diet and acidosis—for the removal of extracellular fluid, while the ketogenic diet has only two factors—high fat diet and acidosis.

"Since no ketogenic diet can be considered a failure until it has failed to maintain the good effects of fasting, it is believed that the institution of the high fat diet should always be preceded by a minimum of five days of complete starvation, water only being allowed.

"Although the data presented have been obtained from children with petit mal epilepsy, there is no apparent reason to suppose that they do not apply to children with major convulsions as well."

C. A. STEWART, M.D.

ROENTGENOLOGY

DIAGNOSIS AND TREATMENT OF THE SO-CALLED SCIATIC NEURALGIAS: Gaston Labot, M.D., and M. B. Green, M.D., New York City (*Amer. Jour. of Surg.*, Volume XI, Number 3, March, 1931, Page 435). The authors review the subject of the so-called sciatic neuralgias, giving a modern method of treatment, and review ten cases, illustrative of the different types in which this disease appears clinically.

The so-called sciatic neuralgias include not only painful conditions of the sciatic nerves, but of the external cutaneous and anterior crural nerves. It is of clinical importance to make a correct diagnosis of the exact nerves involved. For the localization of these involved areas, the authors use an electric percussion hammer.

Instead of caudal or epidural blocking, which is generally used, the authors recommend individual blocking of the involved nerves, in this way avoiding impairment of vesical and anal sphincters, as well as weakness of both lower extremities. Through blocking, the circulation of the infected side is improved, giving greater comfort to the patient.

The solution used is a mixture of alcohol and neocain, made up as follows: Alcohol 95 per cent, solution neocain 2 per cent; the above two mixed in the proportion of 1 to 4 or 5.

Physiotherapy, in the form of diathermy, infra-red rays, and massage, is generally used. The authors think

that diathermy does not give as satisfactory results as infra-red rays and massage. Each case must be individualized and the different changes explained to the patient after the blocking treatment.

One big advantage of nerve blocking is that it avoids addition to harmful narcotic drugs. This method is also used in relieving painful conditions, associated with productive osteoarthritis. The period of relief varies, and cannot be foretold in the individual case; but in general the experience with this individualized and selected form of nerve blocking has given encouraging results, and is worthy of further development.

A. E. SOHMER, M.D.

SURGERY

COCCIDIODAL GRANULOMA — ROENTGEN DIAGNOSIS: Roy A. Carter, M.D. (*Amer. Jour. Roentgen.*, XXV, No. 6, June, 1931, p. 715): The author presents a very complete review of the literature on this subject. Etiology, pathology, treatment, clinical manifestations, diagnosis, lesions of bone and intrathoracic involvement are each considered fully. An excellent review of the entire subject is presented. The value of roentgen examination in this disease is brought out.

The author stresses the following points. Coccidioidal granuloma is roentgenographically similar to tuberculosis. Features of pulmonary and osseous involvement will in some cases permit a provisional diagnosis between them. The association of pulmonary and extrapulmonary lesions in some cases is suggestive. The roentgenologist may thus promote recognition of the disease although he cannot make a positive diagnosis. The resemblance to blastomycosis is greater than to tuberculosis, and distinction would seem difficult, if not impossible. In viewing films of osteomyelitis and tuberculous-like lesions of lungs, the possibility of coccidioidal granuloma, blastomycosis and other infectious granulomata may be considered. The frequent occurrence of infectious granulomata of undetermined origin suggests a field of future study.

The article is well illustrated by many plates showing lesions both in bones and lung.

J. SAGEL, M.D.

EFFECTS OF FEMALE SEX HORMONE ON CONCEPTION

Experiments on guinea-pigs, made with a view of determining the effects of injections of the female sex hormone on conception and on pregnancy, showed that the female sex hormone is the active agent in producing estrus. In previous studies it had been found that injections of the serum from pregnant women would delay the onset of estrus in guinea-pigs. These observations would seem to indicate an antithetic action between the female sex hormone and the corpus luteum

hormone. Other experiments have indicated that the injection of the female sex hormone into pregnant white rats would terminate the pregnancy if it had not exceeded five days. Other investigators also, using white mice, were able to prevent conception and to interrupt pregnancy at any stage with comparatively small doses of the sex hormone. With guinea-pigs small doses of the female sex hormone prevented conception and with larger doses it was possible to interrupt pregnancy and in some cases caused the death of the mother. (*Jour. A. M. A.*, May 16, 1931, p. 1698.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

TEXTBOOK OF HUMAN EMBRYOLOGY. Cleveland Sylvester Simkins, Ph.D., Associate Professor of Anatomy, University of Tennessee Medical School. 8 Vo., 436 pages of text and 263 illustrations. Price, \$4.50. F. A. Davis Co., Publishers.

Professor Simkins has brought together the information up to date on human embryology. It is refreshing to one long out of medical school to take this book and find how much new material and research work has been added to human embryology. The text is done in a terse and yet comprehensive way. The work, of necessity, is a compilation from many sources, but the personality of the author carries along with you through the pages of the well written text a conviction that the work has been well done.

As the author has stated in his preface, "the rapid accumulation of information regarding physiology of reproduction in the human has created a need for a students' text that would incorporate the essential bits of information now available." This part of the text will be particularly edifying to those who have been out of the medical school ten years or more.

The author has drawn freely from all available sources illustrations which assist remarkably in elucidating the text. There is a bibliography of 252 titles which adds materially to the value of the book.

This book can be well recommended to the student and to the physician who wishes to keep abreast of the more recent work done in embryology, which may be of much aid to him in his own restricted field of medicine.

JOHN C. BROWN, M.D.

ANNUAL REPRINT OF THE REPORTS OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR 1930. Cloth. Price, \$1.00. Pp. 91. Chicago: American Medical Association, 1931.

This book is essentially a record of the negative actions of that distinguished body, the Council on Pharmacy and Chemistry of the American Medical Association; that is, it sets forth the findings concerning medicinal preparations which the Council has voted to be unacceptable for recognition and use by the medical profession. Many of the reports record outright rejection or the rescinding of previous acceptances; others report in a preliminary way on products which appear to have promise but are not yet sufficiently tested or controlled to be ready for general use by the profession.

Among the reports recording outright rejection are those on: Avesan (H), formerly Nufoal, a mixture stated to be composed of formic acid, sodium nucleinate, camphor, allyl sulphide and chlorophyll, with traces of salicin and sulphuric ether, marketed with unwarranted claims of usefulness in the treatment of tuberculosis, asthma, and other respiratory diseases; Ceanothyn, once before rejected and still found to be marketed with unsupported therapeutic claims; Collosol Calcium and Collosol Kaolin, so-called colloidal preparations, the former an unscientific mixture of unproved value, the latter a possibly dangerous preparation, and both marketed with unwarranted claims; Ephedrol with Ethylmorphine Hydrochloride, an unscientific ephedrine preparation marketed under an unacceptable proprietary name with unwarranted therapeutic claims; Farastan, an unscientific iodine-cinchophen preparation proposed for routine use in "arthritis . . . and Rheumatoid conditions"; Haley's M-O Magnesia-Oil, a magnesia magma and liquid petrolatum mixture in fixed proportions marketed with emphasis on the "M-O"; Lydin, a testicular extract, marketed with claims of value in the treatment of impotence; and Metatone, a shot-gun "tonic" mixture marketed under a proprietary name with unwarranted therapeutic claims.

WANTED—Salaried appointments for Class A Physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Aznoe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

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WANTED—Position as hospital laboratory technician or physician's office assistant. Training in Chicago hospital. Good references. Viola Witt, Northfield, Minnesota.

WANTED—Scandinavian surgeon of thorough training and pleasing personality for Northwest clinic group. Possible permanent connection. Address D-142, care MINNESOTA MEDICINE.

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